NYE-DT 59

PROJECT NEPTUNE

Update

October 14, 2019

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10.14 NEPTUNE UPDATE

Content summary

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▸ **Technical forecast**

  ▸ Dataset and methodology

  ▸ RTA examples and uncertainties

  ▸ As of 09/2016 forecasts (existent wells)

  ▸ Analog plays comparison

  ▸ As of 09/2019 forecast (full dataset)

  ▸ Reservoir results through time

  ▸ Reserves forecast cross plot

▸ **Economics**

  ▸ Plan submissions summary (2018 / 2019)

  ▸ NGLs yields analysis

  ▸ EURs distributions

  ▸ "Development well" economics

  ▸ Sensitivities

▸ **External view**

  ▸ Public data quality

  ▸ CI EUR view

▸ **Next Steps**

  ▸ Use RTA results - TC by setting

  ▸ Scale to longer laterals

  ▸ Economics refinement – assess well locations

  ▸ External communications reconciliation
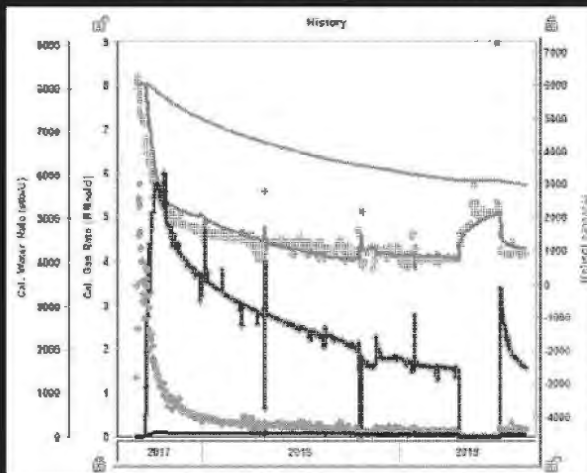
  ▸ NGLs – actual yields for economic analysis

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SAMPLE RTA MODEL RESULTS
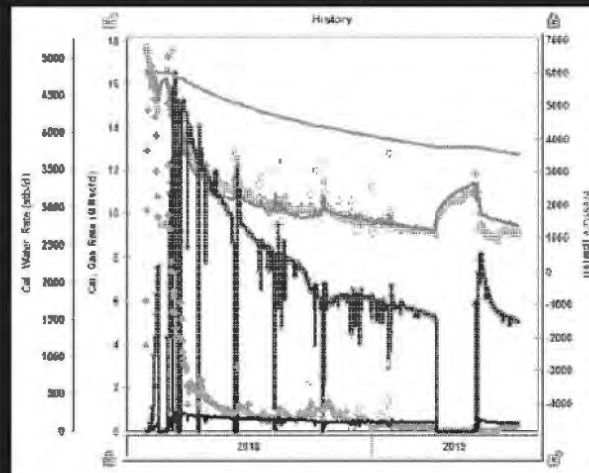
3-Phase Numerical Simulation
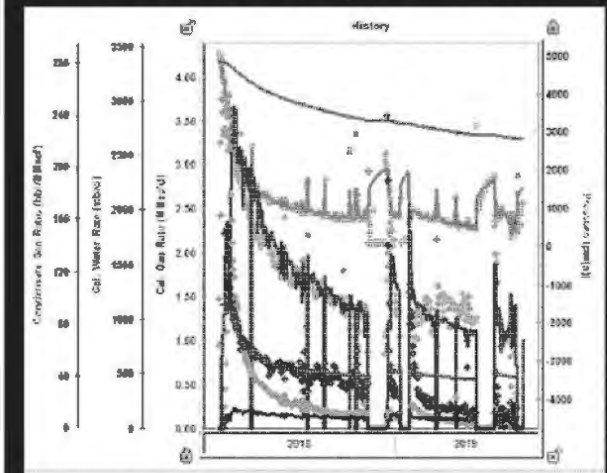
Huckleberry 101CH
EUR: 3.3 BCF; 0 Mbbl

Mohican 101AH
EUR: 10.1 BCF; 0 Mbbl

Chinook 201AR
EUR: 2.1 BCF; 84 Mbbl

192 Alpine Wells Matched to Date with Numerical 3-Phase Model
Available wells matched with data "as of" (4 simulations)
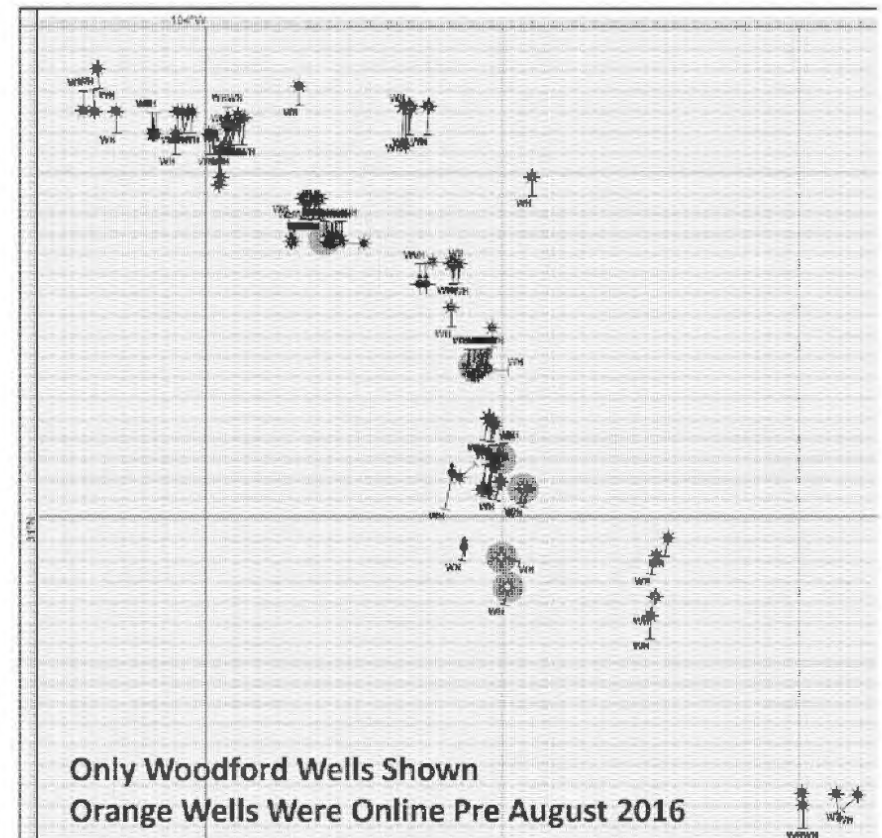Barclays 2016
TPH Oct 2017
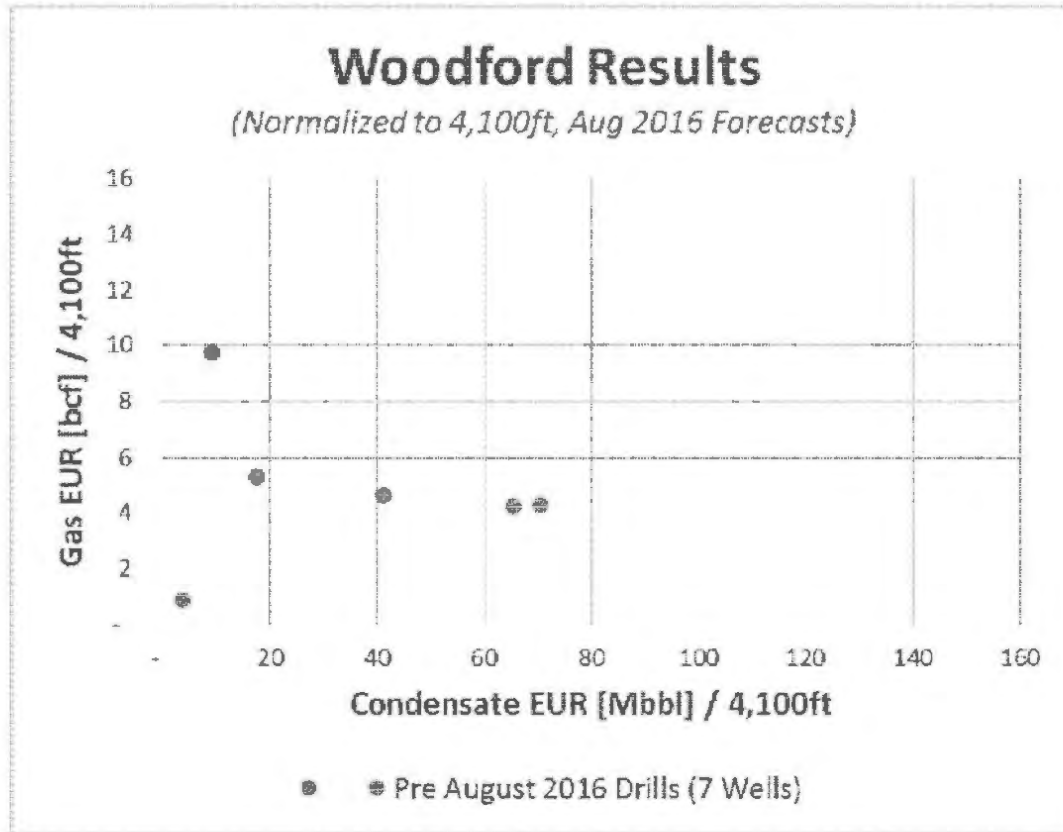Altus Oct 2018
Latest – Oct 2019

WOODFORD WELL PERFORMANCE

Pre August 2016 Forecast

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Woodford Results
(Normalized to 4,100ft, Aug 2016 Forecasts)

Gas EUR [bcf] / 4,100ft

Condensate EUR [Mbbl] / 4,100ft

● Pre August 2016 Drills (7 Wells)

Only Woodford Wells Shown
Orange Wells Were Online Pre August 2016

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WOODFORD WELL PERFORMANCE

Current Forecast

Woodford Results
(Normalized to 4,100ft, Sept 2019 Forecasts)

● Current Woodford (120 Wells)   ● Pre August 2016 Drills (7 Wells)

Only Woodford Wells Shown
Orange Wells Were Online Pre August 2016

BARNETT WELL PERFORMANCE
Aug 2016 Forecasts

Barnett Results
(Normalized to 4,100ft, Aug 2016 Forecasts)

Mont Blanc 201AH

● ● Pre August 2016 Drills (1 Well)

Only Barnett Wells Shown
Purple Well (Mont Blanc 201AH)
Online Pre August 2016

BARNETT WELL PERFORMANCE

Current Forecast

Barnett Results

(Normalized to 4,100ft, Sept 2019 Forecasts)

First Well Revised Up, and Best Barnett Well to Date

- Current Barnett (52 Wells)   • Pre August 2016 Drills (1 Well)

Only Barnett Wells Shown
Purple Well (Mont Blanc 201AH)
Online Pre August 2016

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WOODFORD AND BARNETT PERFORMANCE

Current Forecasts

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Woodford + Barnett Results
(Normalized to 4,100ft, Sept 2019 Forecasts)

- Current Barnett (52 Wells)
- Pre August 2016 Drills (1 Well)
- Current Woodford (120 Wells)
- Pre August 2016 Drills (7 Wells)
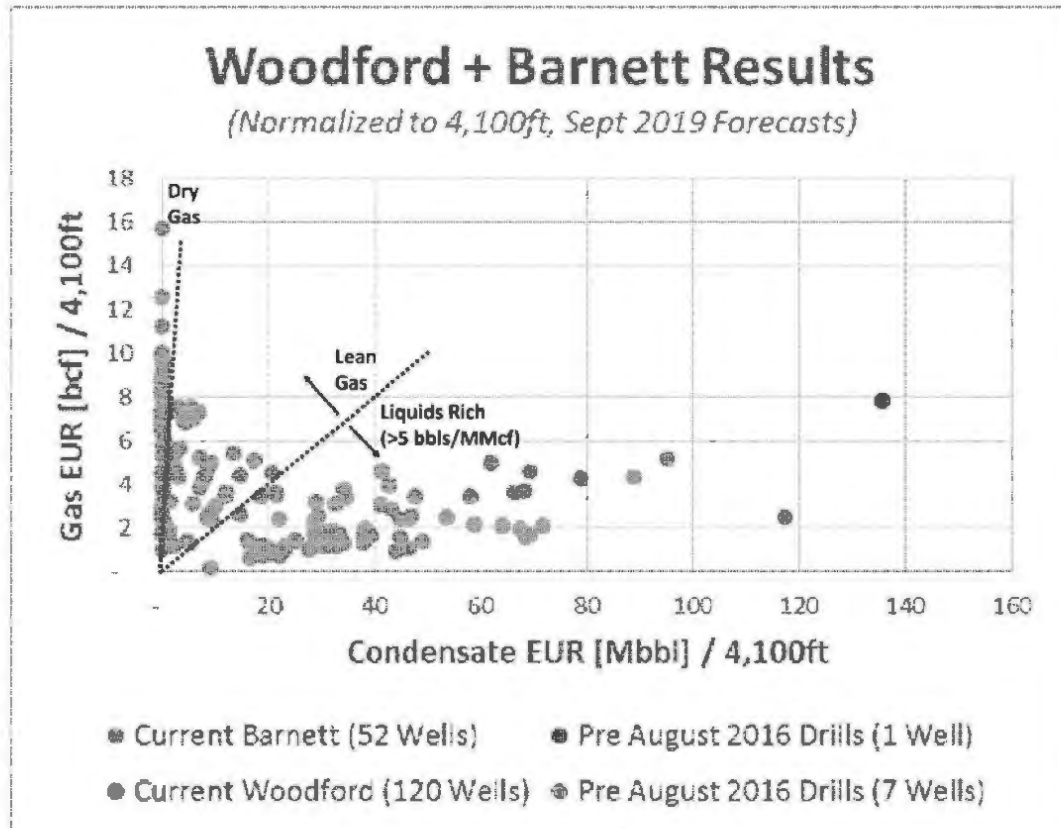
- ▷ *Results not even in the ballpark of primary phase type curves*

- ▷ First Barnett well was a P01 outcome

- ▷ Early Woodford wells were also in upper range

- ▷ Neptune "next steps" could address the differences by setting and fluid type

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RICH GAS EUR DISTRIBUTIONS

Barnett & Woodford – CGR > 5 BO/MMCF. Normalized to 4100'

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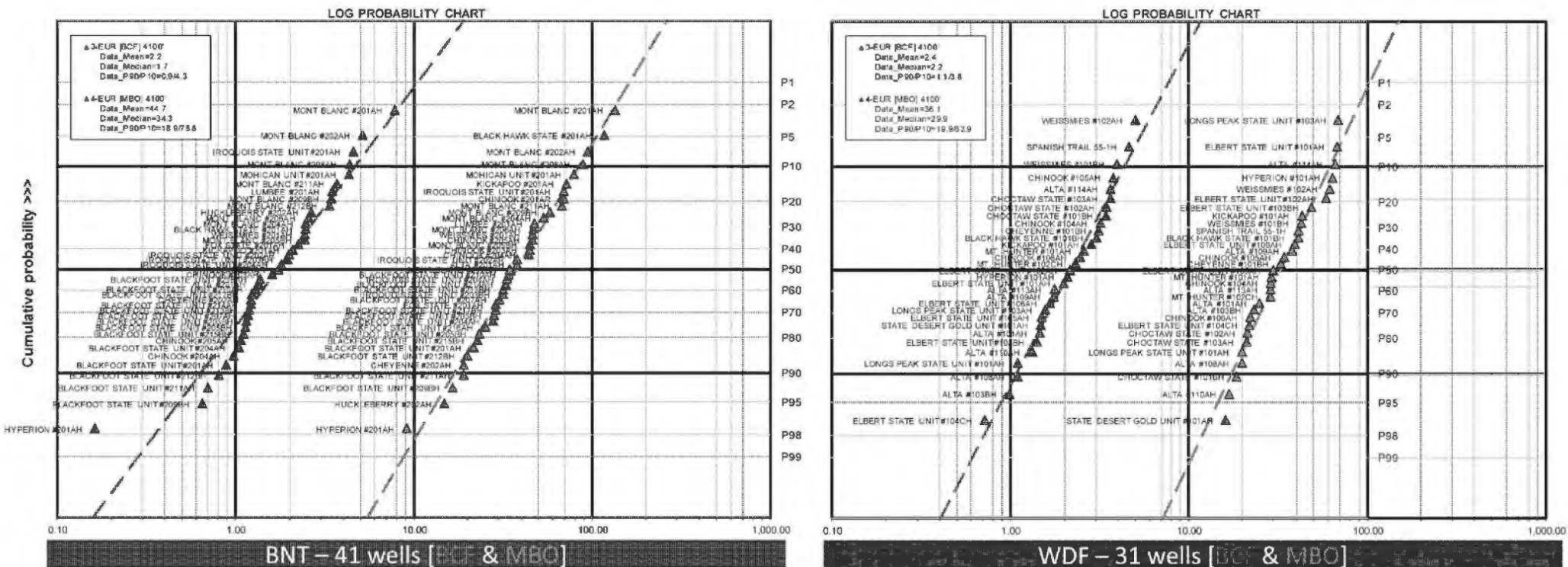
Combined Woodford and Barnett Rich Gas : **P50** Rich Gas ~2bcfe and Oil ~30kbbls   **P10** Rich Gas ~4bcfe and Oil ~70kbbls

LEAN GAS EUR DISTRIBUTIONS

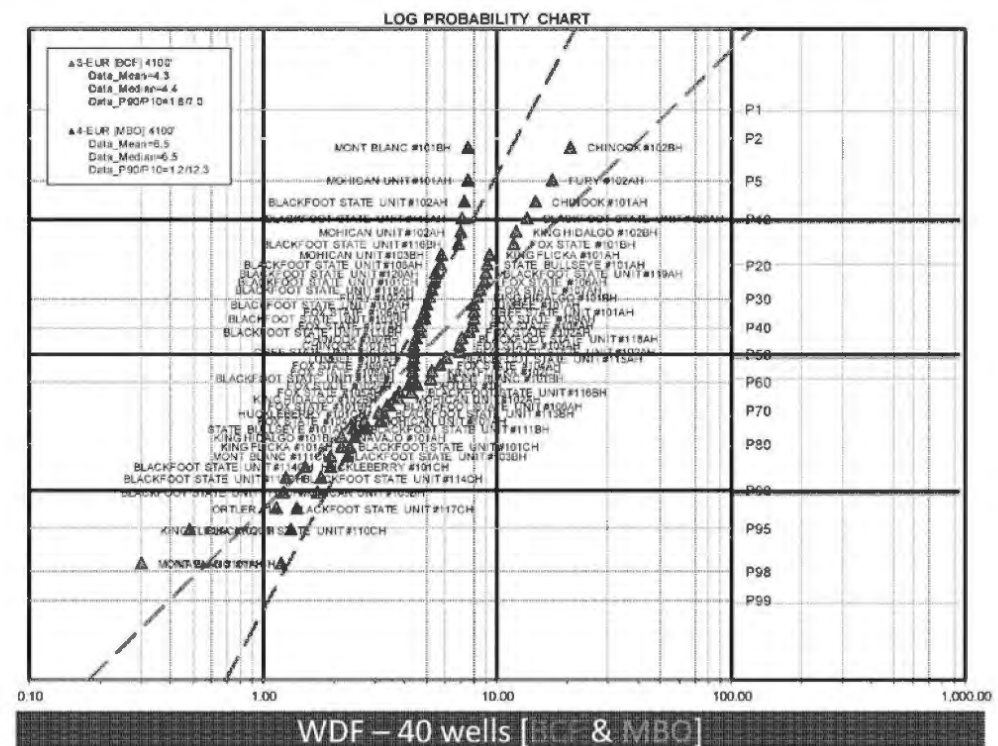Barnett & Woodford – 5 > CGR > 0.1 BO/MMCF. Normalized to 4100'

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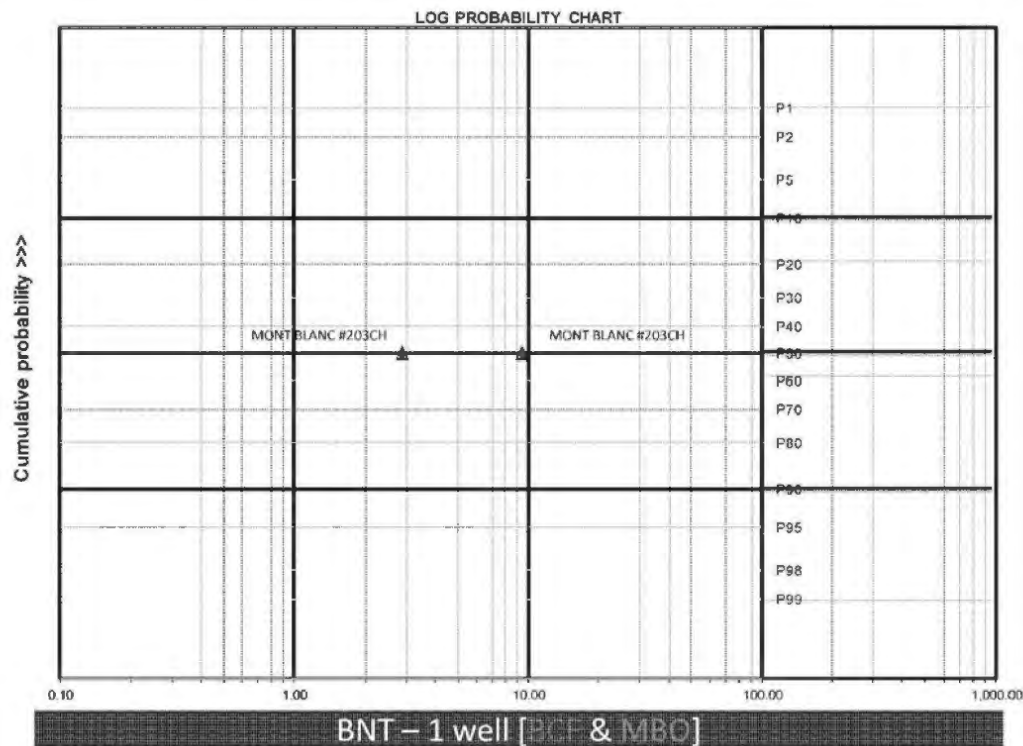
Woodford Lean Gas : **P50** 4.4bcfe and Oil 7kbbls   **P10** 7bcfe and 12kbbls

DRY GAS EUR DISTRIBUTIONS

Barnett & Woodford – 0.1 > CGR BO/MMCF. Normalized to 4100'

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BNT – 10 wells [BCF & MBO]

WDF – 49 wells [BCF & MBO]

Woodford Dry Gas : **P50** 6.9bcfe and **P10** 9.9bcfe

41 of these 59 wells do not go through the Cryo facilities for processing. The remaining 18 do produce NGLs even with CGR < 0.1
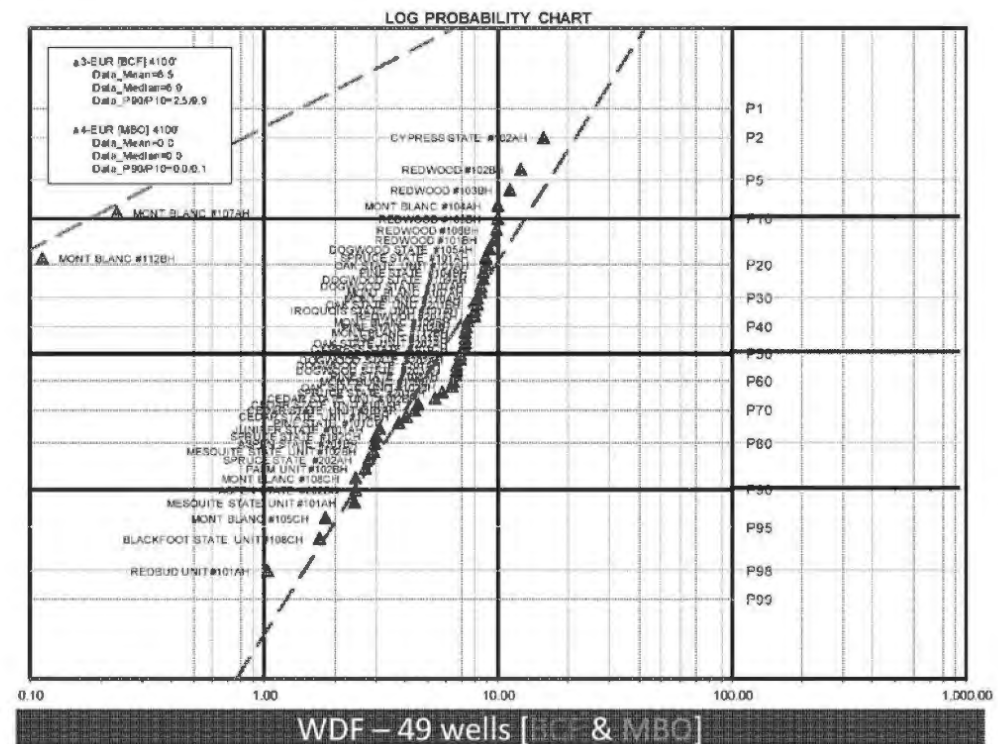
WOODFORD AND BARNETT WELL ECONOMICS

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Current Forecasts

Woodford + Barnett Results
(Normalized to 4,100ft, Sept 2019 Forecasts)
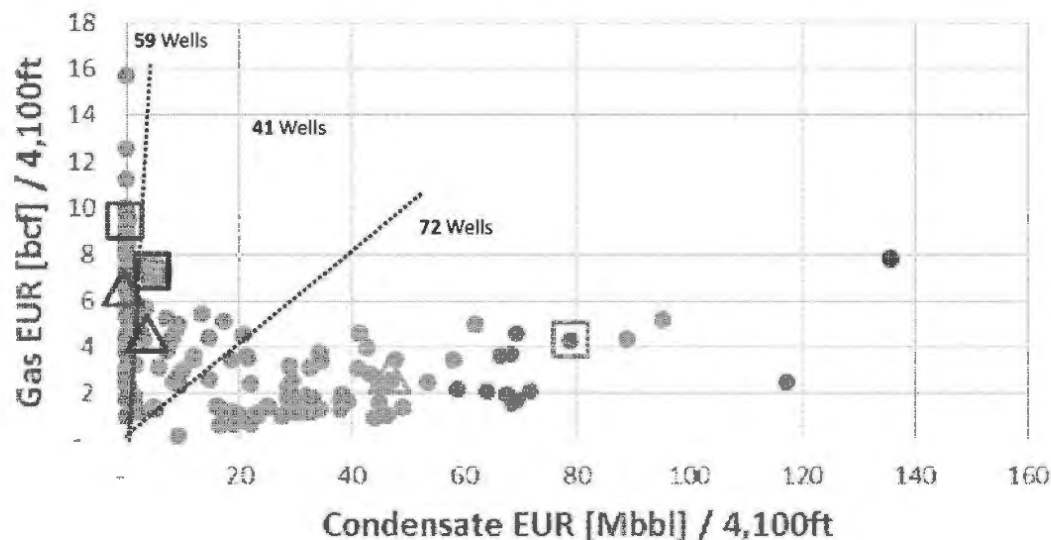
Current Barnett (52 Wells) • Pre August 2016 Drills (1 Well)
Current Woodford (120 Wells) • Pre August 2016 Drills (7 Wells)

	Well	BCF 4100'	MBO 4100'	NPV [$MM]
P10 Rich Gas	Mohican 201AH	4.3	77	(1.9)
P50 Rich Gas	Mont Blanc 205BH	2.4	44	(4.1)
P10 Lean Gas	Blackfoot 102AH	7.1	7	(3.1)
P50 Lean Gas	Fox State 108AH	4.3	8	(4.6)
P10 Dry Gas	Redwood 101BH	9.5	0	(4.4)
P50 Dry Gas	Oak State 102 BH	6.3	0	(5.8)
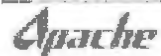
Economics run at 50 / 2.5 / 0.23 – 130 / 80 / 0 BBL/MMCF for Rich / Lean / Dry gas wells. Opex, Fees & burdens aligned with latest FDP model. Gas sales at Waha. DCE Capex = 5MM 4.8 Rich / Lean 5.3 Dry

ECONOMIC SENSITIVITIES

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"What if" scenarios – 4100' *P10 EURs* Base case
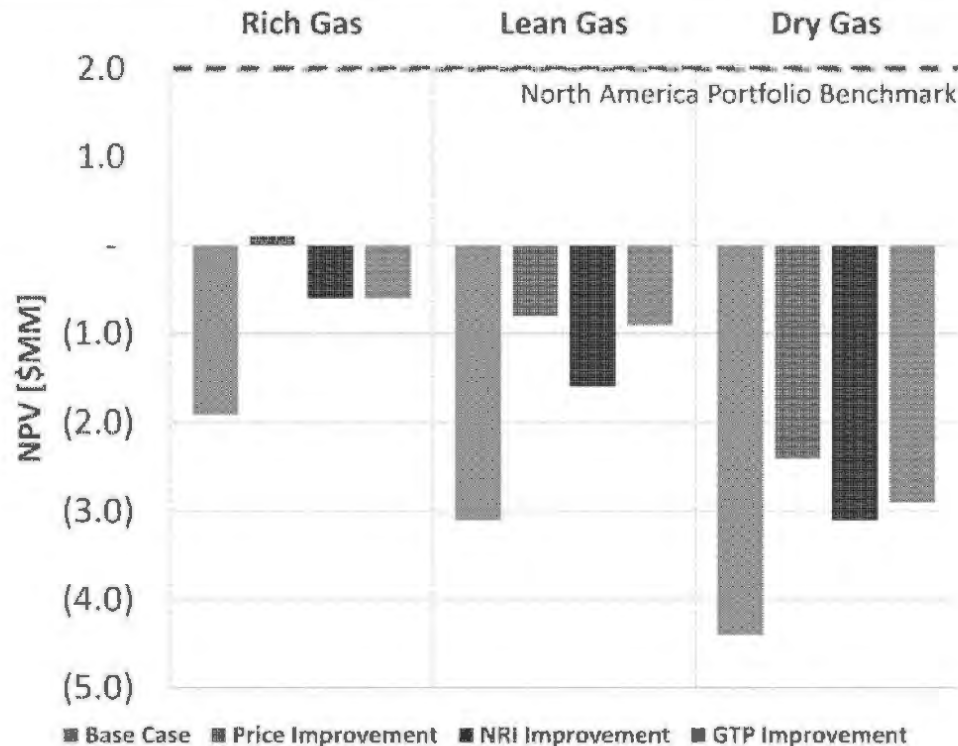
Base case Gross EURs:

- ▶ Rich: 4.3 BCF, 77 MBO => 3.0 BCF, 77 MBO, 550 MNGL => 6.8 BCFE
- ▶ Lean: 7.1 BCF, 7 MBO => 5.7 BCF, 7 MBO, 570 MNGL => 9.2 BCFE
- ▶ Dry: 9.5 BCF, 0 MBO => 8.6 BCF, 0 MBO, 0 MNGL => 8.6 BCFE

Individual Sensitivities

- ▶ Price Improvement: 60 WTI, 3 HH, 0.27 $/gal C2
- ▶ NRI Improvement: 12.5% for Life
- ▶ GTP Improvement: 50% Altus Fees removed

ΔNPV [$MM]	Price	NRI	GTP
Rich Gas	2.0	1.3	1.3
Lean Gas	2.3	1.5	2.2
Dry Gas	2.0	1.3	1.5

Commodity Prices provide the most economic leverage. NRI and GTP less sensitive with lower volumes (EURs)

*Apache*   Economics base case run at 50 / 2.5 / 0.23 – 130 / 80 / 0 BBL/MMCF for Rich / Lean / Dry gas wells. Opex, Fees & burdens aligned with latest FDP model. Gas sales at Waha. DCF Capex = $MM 4.8 Rich / Lean 6.3 Dry

COMPARISON TO ANALOGUE PLAYS

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Updated Alpine Well Results vs. Major North American Shale Plays

Analogue Plays: Data sourced from 2019 RSEG Presentation: *Breaking the (Digital) Barrier* (July 2019); represents average well drilled in each play in 2018 (RSEG forecasts)

COMPARISON TO ANALOGUE PLAYS

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4100' Updated Alpine Well Results vs. Major North American Shale Plays

EUR COMPARISON

2019 Neptune Forecast vs. Reserves Group Technical Recovery Forecast
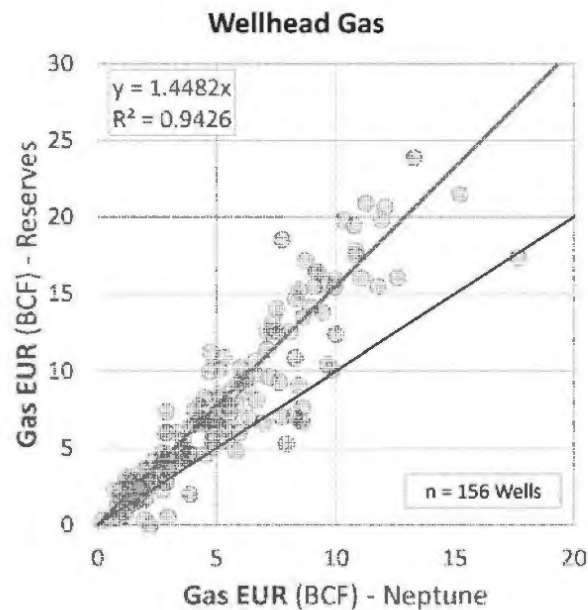
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Wellhead Gas

$y = 1.4482x$
$R^2 = 0.9426$

n = 156 Wells

Gas EUR (BCF) - Reserves (y-axis)
Gas EUR (BCF) - Neptune (x-axis)

Reserves Technical Recovery Forecast
Higher by 44%

Oil / Condensate

$y = 1.2896x$
$R^2 = 0.7679$

n = 122 Wells
> 0 MB Cond. EUR

Condensate EUR (MB) - Reserves (y-axis)
Condensate EUR (MB) - Neptune (x-axis)
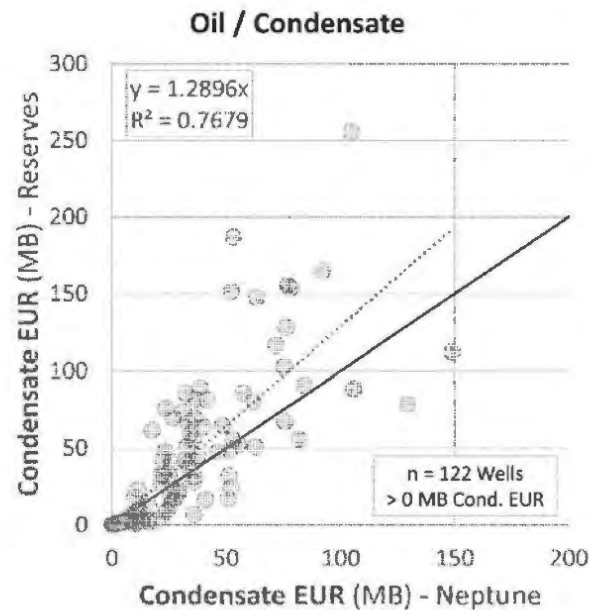
Reserves Technical Recovery Forecast
Higher by 30%

Reconciliation:

Forecast Source	WH Gas (BCF)	Oil / Cond. (MB)
Neptune RTA-Based Forecast	812	3,368
Reserves Technical Recovery Forecast	1,169	4,367
% Difference	+44%	+30%

Notes:

▸ Woodford and Barnett formations only

▸ Only 156 of 172 wells matched and reconciled; Currently reconciling full populations

▸ Neptune RTA-Based forecast from 3-phase numerical simulation in IHS Harmony; 30-year simulation

▸ Reserves Group RAPID-Based forecast represents technical recovery at fixed 100 Mcf/d limit
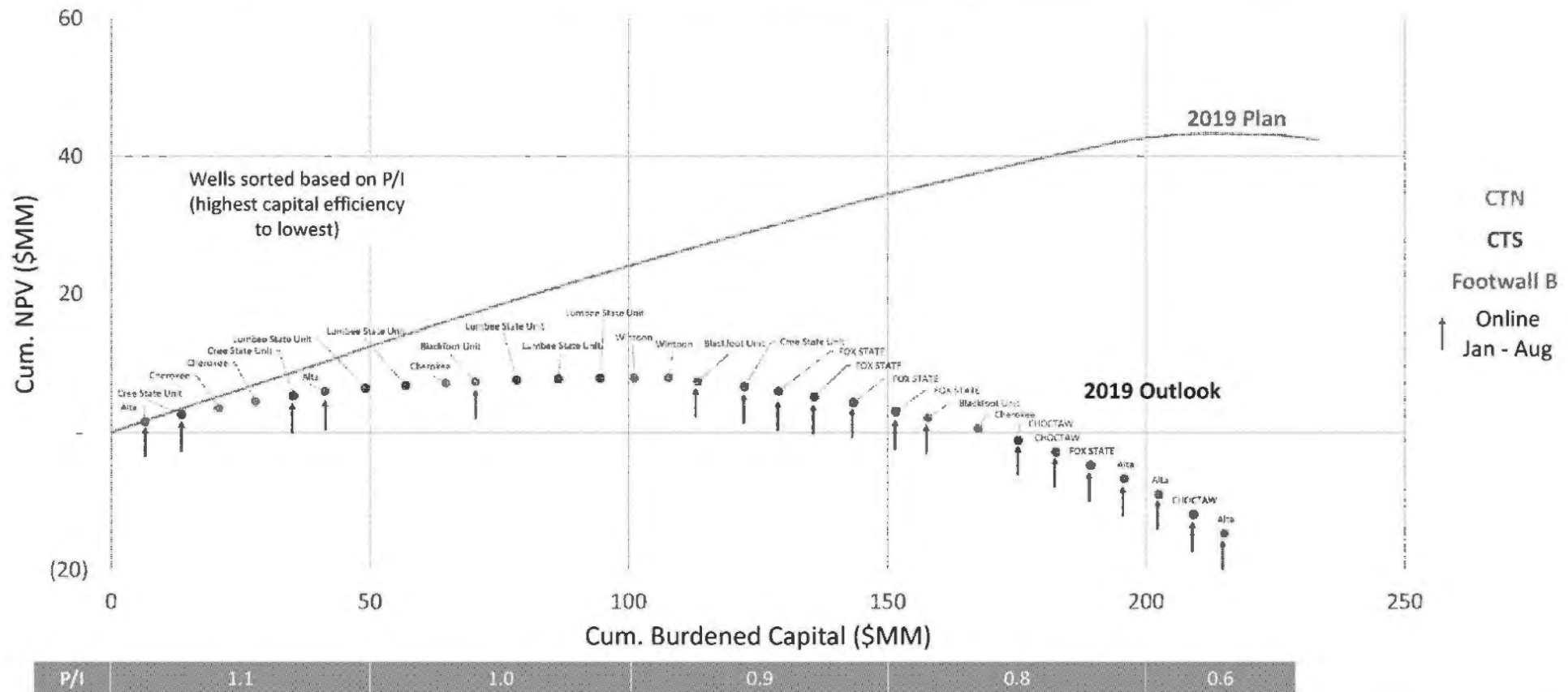
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WHAT DOES THE REGION REALLY THINK?

Plan Submissions with Revisions -- Woodford 2019

WHAT DOES THE REGION REALLY THINK?

Plan Submissions with Revisions – Strategic Tests 2019

2019 WELL EUR: PLAN VS. SEP OUTLOOK

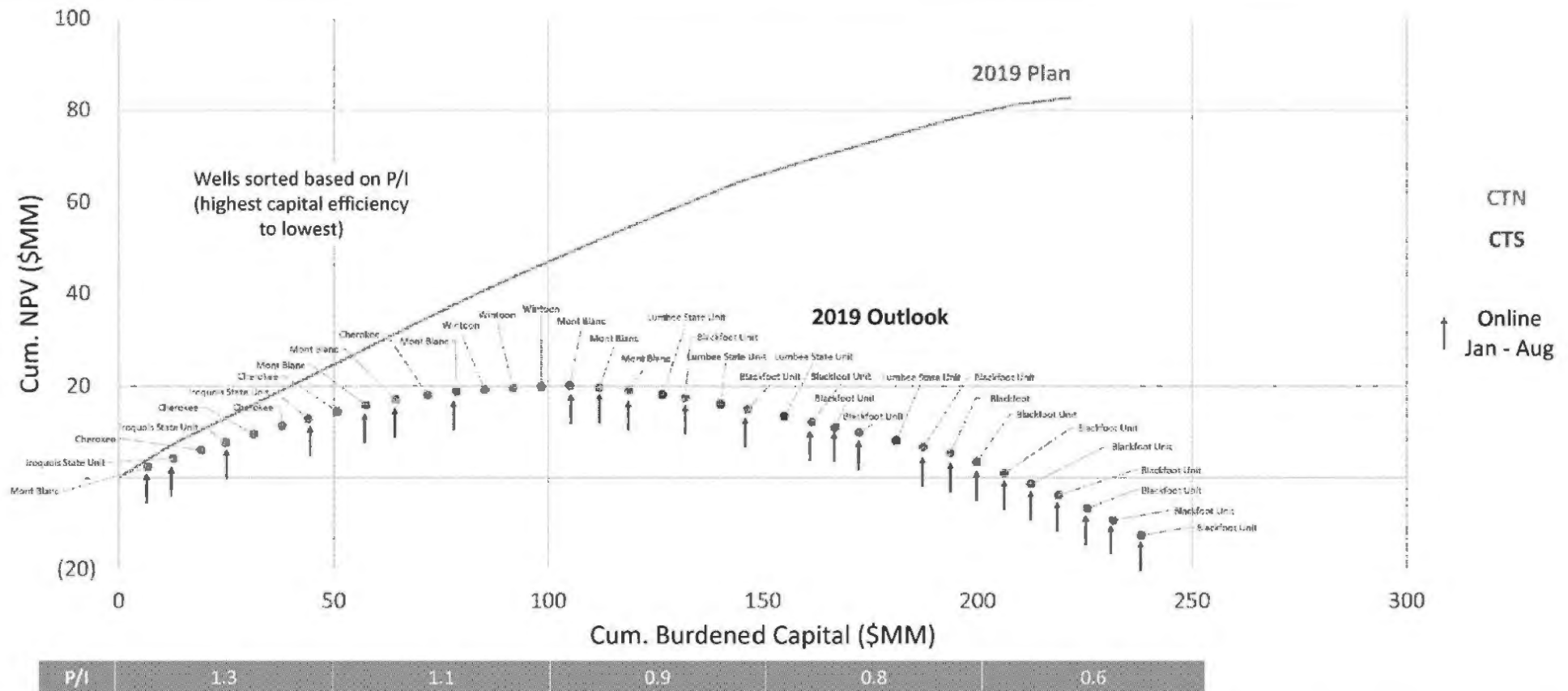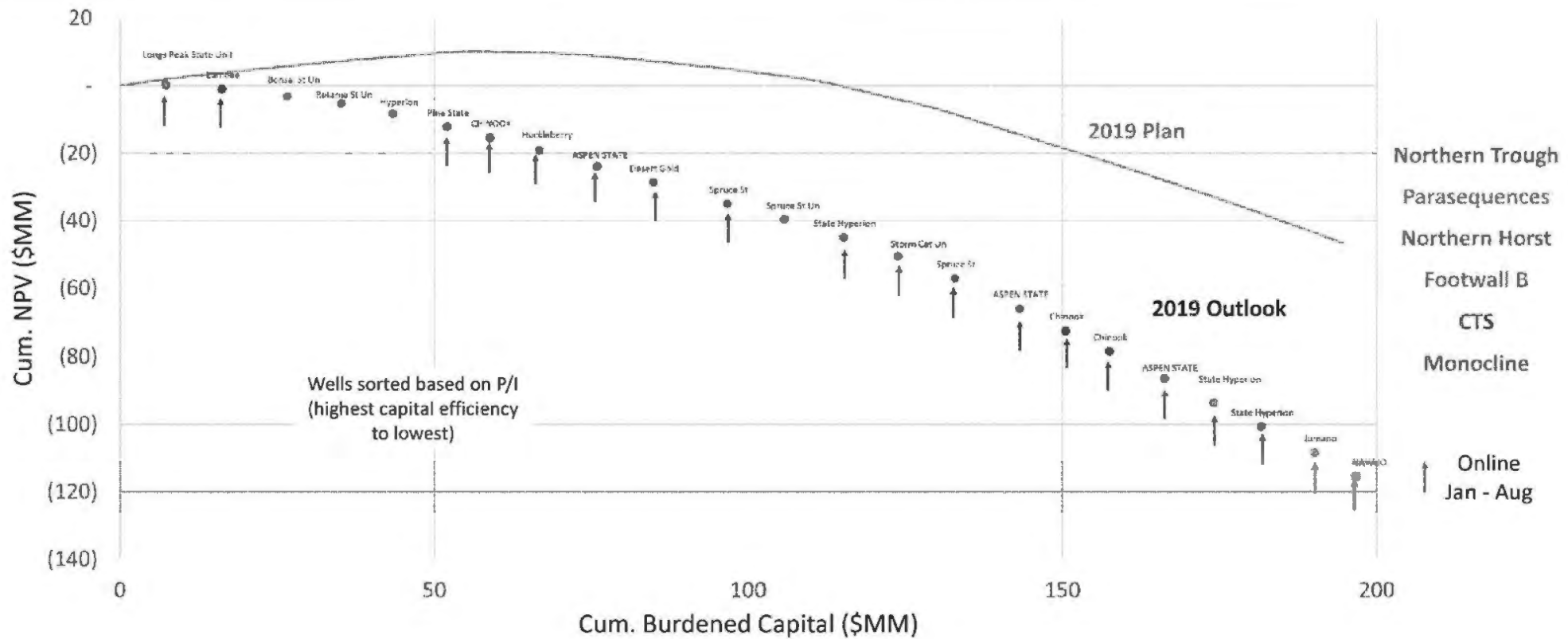| Plan Lease	Date Online	Lean/Rich	2019 Plan Gross Oil (MBO)	2019 Plan Gross WH Gas (MMCF)	2019 Sep Outlook Gross Oil (MBO)	2019 Sep Outlook Gross WH Gas (MMCF)	Difference Gross Oil (MBO)	Difference Gross WH Gas (MMCF)	Difference (%) Gross Oil	Difference (%) Gross WH Gas
Aspen St 201BR	Jan-19	Lean	-	11,711	0	4,099	0	(7,612)	0%	-65%
Aspen St 202BH	Jan-19	Lean	-	11,711	-	2,632	-	(9,079)	0%	-78%
Pine State 106AH	Feb-19	Lean	-	15,199	-	14,053	-	(1,146)	0%	-8%
Spruce St 103AH	Mar-19	Lean	-	15,192	-	12,566	-	(2,625)	0%	17%
Spruce St 202BH	Mar-19	Lean	-	11,694	-	5,429	-	(6,266)	0%	-54%
Fox State Unit 108AH	Dec-18	Rich	22	9,569	3	5,893	(19)	(3,676)	-85%	-38%
Fox State Unit 109AH	Dec-18	Rich	22	9,569	15	6,576	(7)	(2,993)	33%	-31%
Choctaw St 101BH	Jan-19	Rich	14	8,105	4	3,861	(10)	(4,244)	-71%	-52%
Choctaw St 102AH	Jan-19	Rich	14	8,105	16	6,422	2	(1,682)	13%	21%
Choctaw St 103AH	Jan-19	Rich	14	8,105	16	5,723	3	(2,382)	19%	-29%
Fox State Unit 105AH	Jan-19	Rich	22	9,569	8	8,348	(14)	(1,221)	-63%	-13%
Fox State Unit 106AH	Jan-19	Rich	22	9,569	8	7,244	(14)	(2,325)	-63%	-24%
Fox State Unit 107AH	Jan-19	Rich	22	9,569	3	7,127	(19)	(2,443)	-85%	-26%
State Hyperion 101AH	Jan-19	Rich	34	4,752	52	2,516	18	(2,236)	53%	-47%
State Hyperion 201AH	Jan-19	Rich	148	2,061	20	198	(128)	(1,863)	-86%	-90%
Chinook 203AH	Feb-19	Rich	90	3,073	44	2,574	(47)	(499)	-52%	-16%
Lumbee 101AH	Feb-19	Rich	18	10,458	8	10,292	(9)	(166)	-54%	-2%
Desert Gold 101AH	Mar-19	Rich	78	5,373	22	4,335	(55)	(1,038)	-71%	-19%
Huckleberry 202AH	Apr-19	Rich	83	8,663	11	3,066	(75)	(5,597)	-91%	-65%
Alta 113BH	May-19	Rich	79	6,761	39	3,711	(39)	(3,050)	-50%	-45%
Alta 114AH	May-19	Rich	79	6,761	76	6,960	(3)	199	-4%	3%
Mont Blanc 204AH	May-19	Rich	88	8,657	64	5,274	(24)	(3,383)	-27%	-39%
Mont Blanc 205BH	May-19	Rich	88	8,657	62	5,261	(26)	(3,396)	-30%	-39%
Mont Blanc 206AH	May-19	Rich	88	8,657	78	5,513	(10)	(3,145)	-11%	-36%
Mont Blanc 208AH	May-19	Rich	88	8,657	99	7,222	11	(1,435)	13%	-17%
Mont Blanc 209BH	May-19	Rich	88	8,657	70	7,124	(17)	(1,534)	-20%	-18%
Mont Blanc 211AH	May-19	Rich	88	8,657	75	6,984	(13)	(1,673)	-15%	-19%
Mont Blanc 212BH	May-19	Rich	88	8,657	46	6,984	(41)	(1,673)	-47%	-19%
Alta 108AH	Jun-19	Rich	79	6,761	39	3,784	(40)	(2,977)	-50%	-44%
Alta 109AH	Jun-19	Rich	79	6,761	65	6,076	(14)	(685)	-18%	10%
Alta 110AH	Jun-19	Rich	79	6,761	24	2,382	(54)	(4,379)	-69%	-65%

Plan Lease	Date Online	Lean/Rich	2019 Plan Gross Oil (MBO)	2019 Plan Gross WH Gas (MMCF)	2019 Sep Outlook Gross Oil (MBO)	2019 Sep Outlook Gross WH Gas (MMCF)	Difference Gross Oil (MBO)	Difference Gross WH Gas (MMCF)	Difference (%) Gross Oil	Difference (%) Gross WH Gas
Blackfoot Unit 119AH	Jun-19	Rich	-	13,860	1	8,952	1	(4,908)	0%	-35%
Blackfoot Unit 120AH	Jun-19	Rich	-	13,860	2	7,344	2	(6,516)	0%	-47%
Blackfoot Unit 209BH	Jun-19	Rich	88	8,652	33	2,878	(54)	(5,774)	-62%	-67%
Blackfoot Unit 212BH	Jun-19	Rich	88	8,652	45	3,433	(43)	(5,219)	-49%	-60%
Blackfoot Unit 213BH	Jun-19	Rich	88	8,652	61	3,824	(26)	(4,829)	-30%	-56%
Blackfoot Unit 214AH	Jun-19	Rich	88	8,652	78	3,616	(9)	(5,036)	-11%	-34%
Blackfoot Unit 215BH	Jun-19	Rich	88	8,652	49	3,615	(39)	(5,037)	-44%	-58%
Blackfoot Unit 216AH	Jun-19	Rich	88	8,652	57	4,213	(31)	(4,439)	-35%	-51%
Blackfoot Unit 217BH	Jun-19	Rich	88	8,652	55	3,528	(33)	(5,124)	-37%	-59%
Blackfoot Unit 118AH	Jul-19	Rich	-	13,860	1	7,461	1	(6,399)	0%	-46%
Blackfoot Unit 201AH	Jul-19	Rich	88	8,652	48	3,507	(40)	(5,145)	-46%	-59%
Blackfoot Unit 203BH	Jul-19	Rich	88	8,652	48	3,530	(39)	(5,122)	-45%	-59%
Blackfoot Unit 204AH	Jul-19	Rich	88	8,652	38	2,704	(50)	(5,948)	-57%	-67%
Blackfoot Unit 205BH	Jul-19	Rich	88	8,652	57	4,284	(31)	(4,368)	-35%	-50%
Blackfoot Unit 207AH	Jul-19	Rich	88	8,652	45	3,137	(43)	(5,515)	-49%	-64%
Blackfoot Unit 210AH	Jul-19	Rich	88	8,652	62	4,360	(26)	(4,292)	-37%	-50%
Blackfoot Unit 211AH	Jul-19	Rich	88	8,652	38	3,307	(49)	(5,345)	-56%	-62%
Chinook 204AH	Jul-19	Rich	177	4,703	11	395	(166)	(4,308)	-94%	-92%
Chinook 205AH	Jul-19	Rich	177	4,703	9	407	(168)	(4,296)	-95%	-91%
Cree St Unit 103AH	Aug-19	Rich	14	8,107	15	8,609	1	502	8%	6%
Cree St Unit 104AH	Aug-19	Rich	14	8,107	15	8,609	1	502	8%	6%
Cree State Unit 102BH	Aug-19	Rich	14	8,127	15	8,609	1	482	8%	6%
Cherokee 101AH	Sep-19	Rich	-	13,852	-	13,053	-	(799)	0%	-6%
Cherokee 102BH	Sep-19	Rich	-	13,852	-	13,053	-	(799)	0%	-6%
Cherokee 104BH	Sep-19	Rich	-	13,852	-	13,053	-	(799)	0%	-6%
Cherokee 205AH	Sep-19	Rich	88	8,648	74	6,785	(14)	(1,863)	-15%	-22%
Cherokee 203BH	Nov-19	Rich	88	8,648	74	6,776	(14)	(1,872)	-16%	-22%
Lumbee Placeholder 102AH	Nov-19	Rich	14	8,115	15	8,588	1	473	8%	6%
Lumbee Placeholder 103AH	Nov-19	Rich	14	8,115	15	8,588	1	473	8%	6%
Bonsai Unit 201AH	Dec-19	Rich	88	8,677	65	4,209	(23)	(4,468)	-26%	-51%

The Region has revised the 2019 Outlook <u>significantly</u> lower vs. Plan (and much lower vs. "type curves")

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Note: Only wells in Plan as well as in the Outlook are shown

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OCTOBER 2017 INVESTOR DAY

Typical Well Economics

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WET GAS PLAY: FULLY BURDENED ECONOMICS
Development Scenario (4,400' Lateral)

Typical Well			Upper Range Well		
EUR / Well (Bcfe)	9	-	15	EUR / Well (Bcfe)	16	-	21

- "these wells are reflective of our 3,500+ wet gas locations that are primarily in the Barnett and Woodford and span the majority of our acreage position."*

- "...the weighted average typical wet gas well is estimated to produce 13.3 bcfe...of which 6% is oil or 130kbbls per well"*

- Our analysis suggests actual results are materially below the published "Typical Well"

The EURs from this slide were used as recently as **Jan 2019** in an Altus deck

*From October 2017 "TPH" transcript

WHAT IS IN THE PUBLIC DOMAIN?

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Third Party "Analysis" will start to drive the AH narrative

▶ **139 AH wells in the IHS Database**

  ▶ Wet Gas (CGR>5) – 29 wells

    ▶ P50 2.7bcfe (~50kbbls oil)

    ▶ P10 7.1bcfe

  ▶ Dry Gas – 68 wells

    ▶ P50 10bcfe (Region using 17bcf for type curve economics)

  ▶ Lean Gas – Work still in progress

> Public Data EURs > Our RTA analysis...but well below prior public announcements

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WHAT ABOUT WELL LOCATIONS?

Not yet in our analysis....but some observations

- **September BOD meeting...Regions view**
  - Dry Gas – 506 potential locations
    - _Only ~50% economic_ at aggressive gas price AND significantly improved terms
  - Wet Gas – 847 potential locations
    - _Only 60% economic_ at aggressive commodity prices AND significantly improved terms
  - Oil – 365 potential locations
    - _Only 10% economic_ at $65/bbl oil
  - Monocline – 2709 potential locations (Oil and Gas)
    - _0% (Zero) economic_ as "too complex to characterize"....3 years after Barclays announcement

....but the primary phase type curves were said to be "on target"

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NEPTUNE 10.4 UPDATE

Findings summary

▷ **Technical forecast**

- ▷ Initial wells rank in the P10+ ranges considering the complete population to date
- ▷ Gas EURs disconnected from external presentations
  - ▷ Detect trend very early in well life
- ▷ Condensate EUR estimations revised down significantly over time
  - ▷ Detect trend very early in well life
- ▷ NGL yields measurements (Cryo and Battery level) misses initial assumptions

▷ **Economics**

- ▷ Capex and Opex inline with original estimations
- ▷ Revenue lines are the main difference with external communications
- ▷ *Short lateral limits economic development*
- ▷ Leverage to gas price > leverage to changing commercial terms

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NEPTUNE 10.4 UPDATE

Potential next steps

- ▶ Use RTA results as a basis for updated type curves
  - ▶ Reservoir and Fluid Windows
- ▶ Scale type curves to 2 mile laterals
  - ▶ Assess economics
  - ▶ If improved, where are the opportunities to drill longer laterals?
  - ▶ Reassess well locations / future opportunity set
- ▶ Assess "technical" well spacing on current pads
- ▶ NGLs – assess future liquid yields
- ▶ Appraisal strategy lookback
- ▶ External communications reconciliation

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BACKUP SLIDES

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ANALYST OPINIONS: THEN VS. NOW

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The bulls turn more muted

⭐ **Barclays 2016**

⭐ **2019 View**

The play has the **potential to be a transformative event for the company**, namely addressing a previous investor pushback regarding a lack of contiguous acreage.

❏ Raymond James 9/7/16 (Outperform; $72 price target)

The recent downturn in Permian gas prices and NGL prices, while an obvious headwind for the company, has demonstrated the operators commitment to value creation over volume production, and **we believe the deferrals at Alpine High are the prudent move given the prices at WAHA hub and the looming uncertainty with NGLs. While results in the U.S. have trailed expectations, several exciting exploration opportunities in Egypt and Suriname offer attractive upside** and exposure to Brent oil prices.

❏ Raymond James 8/5/19 (Outperform, $32 price target)

We've raised our NAV by $13/share to $53.70/share. **Roughly $10/share of our NAV increase is attributed to the new Alpine High play, where we assume 4 Bboe of net resource based on the midpoint of APA's wide ranging well economics for the area.**

❏ UBS, 9/7/16 (Buy; $54 PT)

The combination of lower oil volumes and reiterated FY19 capex has led us to revise sustainable capital efficiency for oil. **The market is continuing to look for oil results in Alpine High. Weak natural gas and NGL pricing...has led APA to shut in wells, and we remain cautious on GCX completely addressing the issue...The real option value for APA though is its exploration potential in Suriname.**

❏ UBS 8/5/19 (Sell, $21 price target)

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ANALYST OPINIONS: THEN VS. NOW

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The bulls turn more muted

★ **Barclays 2016**

★ **2019 View**

We view the Alpine High, though not without risk, **as a scalable short-cycle opportunity**, which was previously not present in the company's asset portfolio. **We think that the contiguous position lends itself to future catalyst potential, with potential NAV upside** driven by productivity enhancement in the Barnett/Woodford as completion techniques are refined, resource delineation in the two intervals that would expand current inventory which we risk at ~2200 net locations and a call option on Bone Spring/Wolfcamp upside longer-term.

☐ Wolfe 9/8/16 (Peer Perform, N/A price target)

APA's stock has remained a tug-of-war this year between Suriname exploration potential and the challenges Alpine High is facing from declining natural gas and NGL prices. **Unfortunately for APA, the delay in getting exploration kicked off has brought the Alpine High issues back in front, leading to significant underperformance vs. Large Cap peers over the last month, and the 2Q update showed the price environment is making it a challenge to get growth going as expected at the cornerstone asset.**

☐ Wolfe (Peer Perform, $32 price target)

The key point inside is that the low clay content and excellent porosity is why the rocks are so productive in a lower pressure and hence lower cost environment…Running a longer rig program to fully develop this large resource, downspacing, play optimization or providing credit to the oilier Wolfcamp and Bone Spring would be sources of further upside. **It is worth engaging with APA to understand why this could prove to be a truly world class resource.**

☐ Credit Suisse 9/8/16 (Neutral; $67 PT)

NGLs are expected to account for >40% of Alpine High production in 2020, leaving APA with significant exposure to the weak NGL pricing environment and market outlook. **[Alpine High] remains economic in this pricing environment, however it does not compete with Egypt (which offers higher returns) or the Midland Basin (higher NPVs).** Thus, it remains unclear which area APA may redirect capital to next year…or if it intends to use the reduced capex from Alpine High to fund further debt reduction.

☐ Credit Suisse 8/8/19 (Neutral, $25 price target)

Apache

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ANALYST OPINIONS: THEN VS. NOW

★ **Barclays 2016**

APA surprised with a large, low cost, organic resource play in the Delaware basin with strong initial wells. **For potential NAV accretion we're taking a conservative view until more wells/longer-term data is released. APA's 1.1-2.7 mmboe EURs imply 1.6-4.0 Bcfe/1,000 ft. which are at or above (i) what many E&Ps currently recover in-basin and (ii) most gas plays we cover.**

❑ TPH, 9/7/16 (Hold; N/A price target)

★ **2019 View**

Without Suriname as a talking point, focus will likely be on updated Alpine High thoughts as ramp of two Cryo plants is somewhat offset by persistent NGL weakness continuing to weigh on the play's economics...We'd expect continued upstream capital allocation to the play as company messaging remains bullish re:H2'19 ethane/propane capacity/infrastructure adds. While name has materially lagged, **we remain sidelined as we await more fulsome Alpine High well data and clearer line of sight to deleveraging.**

❑ TPH, 7/17/19 (Hold; $31 price target)

We were somewhat taken aback by the magnitude of the favorable read on APA shares following yesterday's disclosures of newly minted (pun intended) resource play, Alpine High...**We took the update as a net mixed given limited near term prod'n and cash flow impact despite near term capex pressure...** Taking some time to model out the Alpine High, we continue to view yesterday's update as mixed.

❑ Heikkinen, 9/8/16 (Bottom-tier, N/A price target)

We are told all that matters for APA shares is its upcoming Suriname test, but we took the time to recalibrate our APA model for Alpine High anyway. Given the number of uncertain variables here and lack of detail/disclosures from the company, we are pretty sure our model is not perfect, but we are also sure that it is materially better than most. **APA shares continue to screen as a poor risk-reward under our framework, however we acknowledge our system has at times failed to adequately capture the potential for the market's imagination to rerate stocks higher in the context of exploration** (i.e. HES).

❑ Heikkinen, 4/25/19 (Bottom-tier, N/A price target)

Apache 29

ANALYST OPINIONS: THEN VS. NOW

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★ **Barclays 2016**

While this new find is significant and Apache is deservedly excited about its new discovery in this relatively untapped part of the Delaware Basin, previous well results in the immediate area have been poor. It has been hit or miss...It remains to be seen whether Apache's initial success in the play will carry over into the Wolfcamp formation. It's too early to tell, but more drilling and appraisal will be necessary. **Early economics for the area indicate gas production breaks even near $2.50/Mcf of gas and oil production breaks even at $55/bbl assuming a constrained 24-hour initial production rate equates to peak-month production and a $5 million well cost. However, if recently published IP rates indicate true 24-hour rates, then break-evens for the play will be closer to $3.00/Mcf and $65/bbl.**

❏ IHS, September 2016

★ **2019 View**

As the Alpine High approaches its critical 100th well, each new well result in the Alpine High **confirms the play as gas prone with Dry Gas and Wet Gas windows.** A limited sweetspot is present in the north-central portion of the play where the targets are relatively deep. **Based on current assumptions, the play is borderline economic with current breakevens at or above $2.50/MMBtu to Henry Hub.**

Apache remains the only operator in the play and owns the gathering, processing, shares in long haul pipeline to the Gulf Coast through its majority position in Altus Midstream, as well as long-term LNG contracts. **However, these various vertical integrations are insufficient to push the play past a moderate return.**
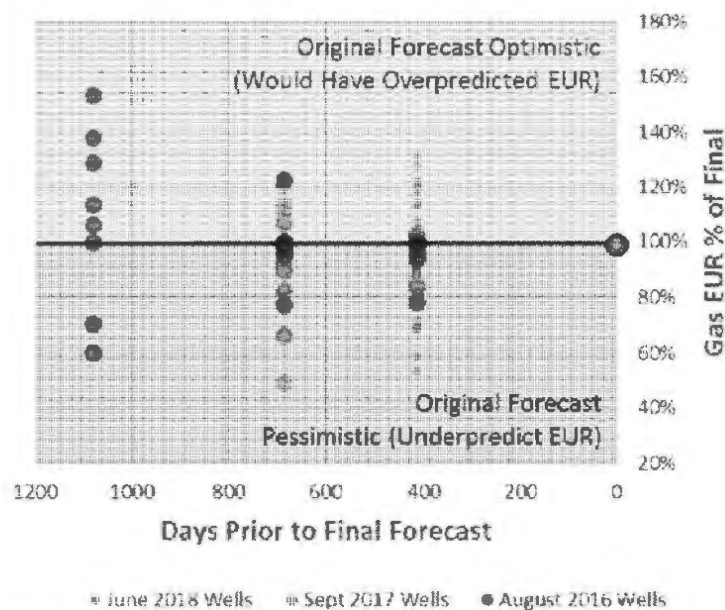
❏ IHS, July 2019

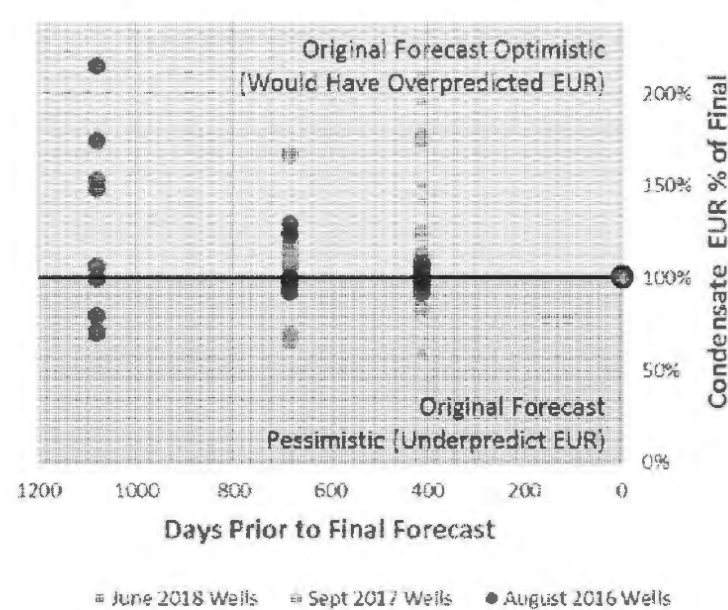*Apache*

HARMONY MODEL ROBUSTNESS

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Evolution of forecast through time

Gas EUR Robustness

Original Forecast Optimistic
(Would Have Overpredicted EUR)

Original Forecast
Pessimistic (Underpredict EUR)

Days Prior to Final Forecast

■ June 2018 Wells   ■ Sept 2017 Wells   ● August 2016 Wells

Condensate EUR Robustness

Original Forecast Optimistic
(Would Have Overpredicted EUR)

Original Forecast
Pessimistic (Underpredict EUR)

Days Prior to Final Forecast

■ June 2018 Wells   ■ Sept 2017 Wells   ● August 2016 Wells

2016 Wells	% of Final Forecast	
	Gas %	Cond %
Aug 2016	109%	131%
Sept 2017	99%	109%
June 2018	96%	100%

2017 Wells	Gas %	Cond %
Sept 2017	95%	105%
June 2018	97%	107%

2018 Wells	Gas %	Cond %
June 2018	97%	130%

Early times **accurate Average Gas EUR, Condensate EUR's required additional production** information for stable estimations.
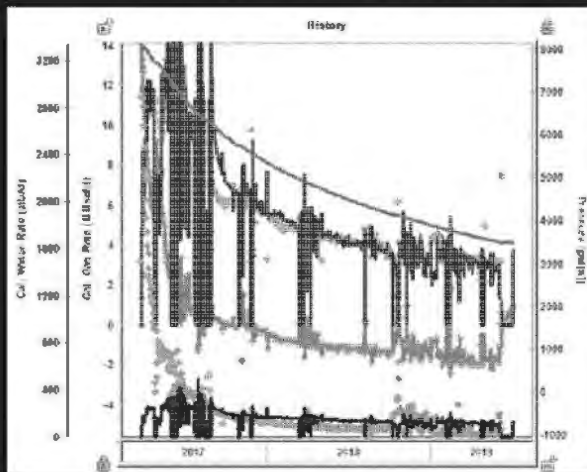
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SAMPLE RTA MODEL RESULTS

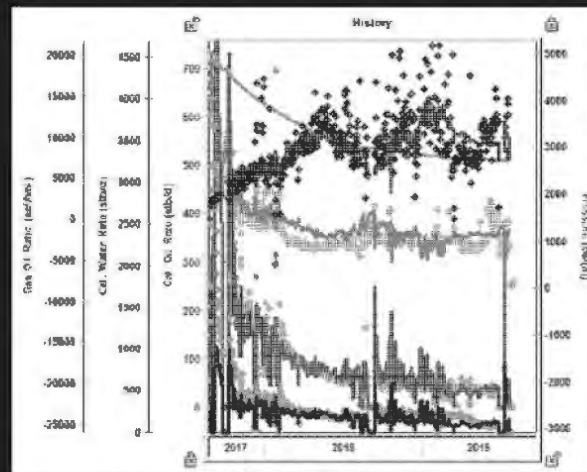## 3-Phase Numerical Simulation

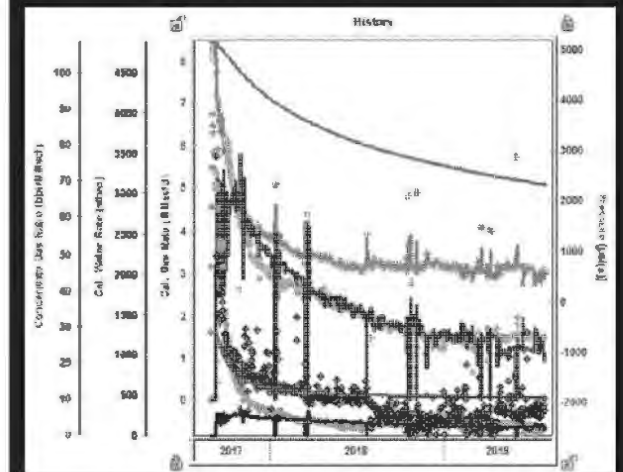DRAFT - CONFIDENTIAL

Redwood 201AH
EUR: 8.1 BCF; 0 Mbbl

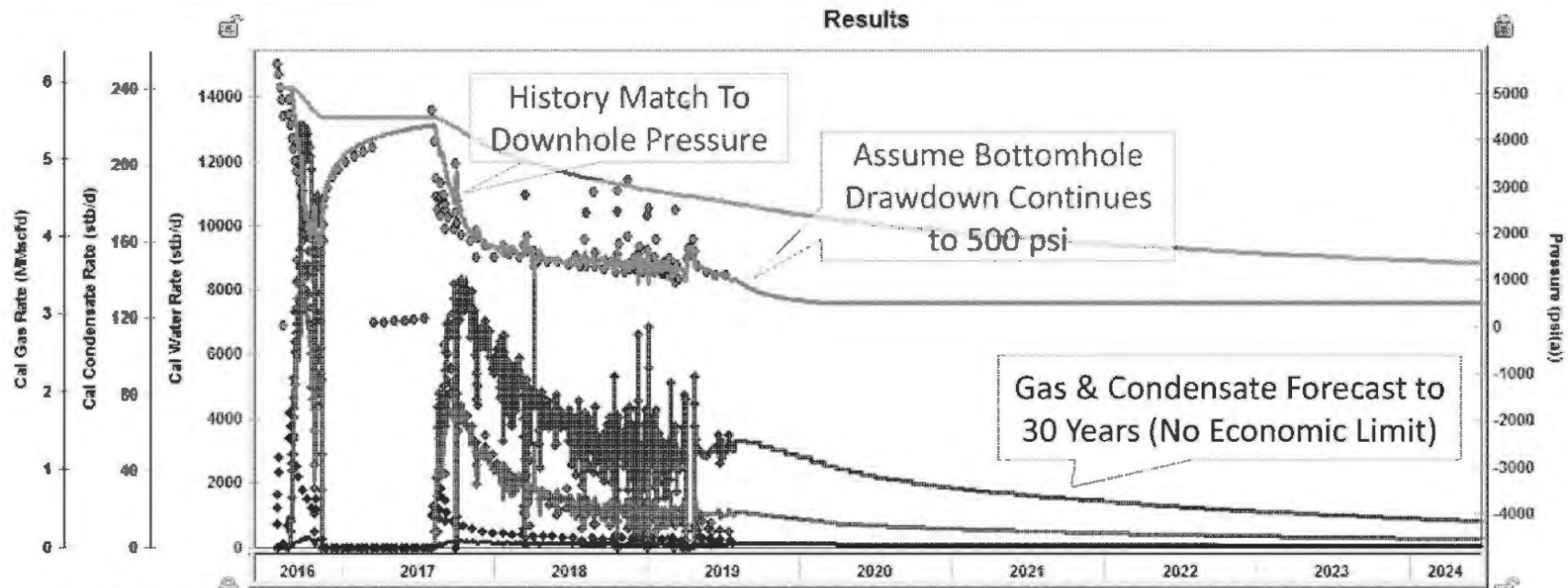**Cypress State 401AH**
EUR: 2.5 BCF; 165 Mbbl

Mt. Hunter 101AH
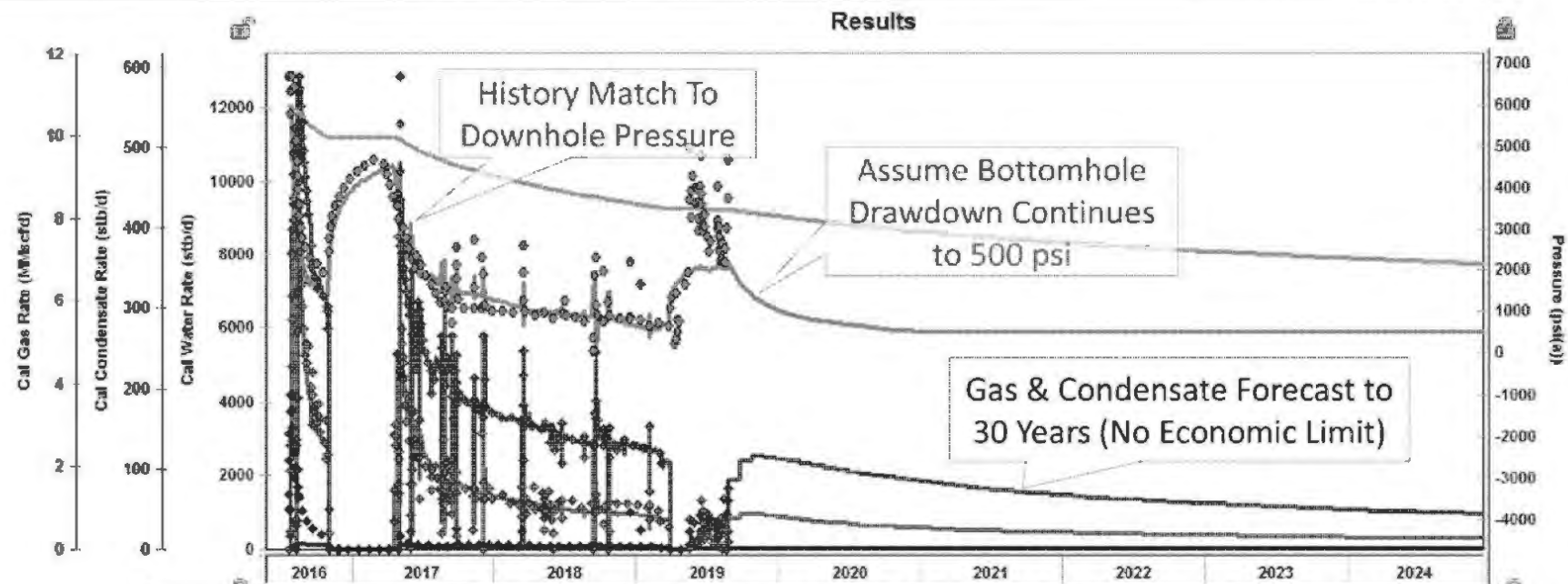EUR: 3.0 BCF; 34 Mbbl

BLACK HAWK STATE 101BH

Harmony EUR Forecast

	Small OGIP (65%) (H=120ft; Xf= 230ft)	Base Case (H=150ft; Xf= 285ft)	Large OGIP (150%) (H=180ft; Xf= 350ft)
Actual 1 Year Gas	0.9 bcf	0.9 bcf	0.9 bcf
5 Year Cum Gas	2.0 bcf	2.2 bcf	2.2 bcf
30 Year Cum Gas	2.6 bcf	3.9 bcf	4.9 bcf

OGIP Can Swing EUR by ~20%, But Only In The 5-30 Yr Period

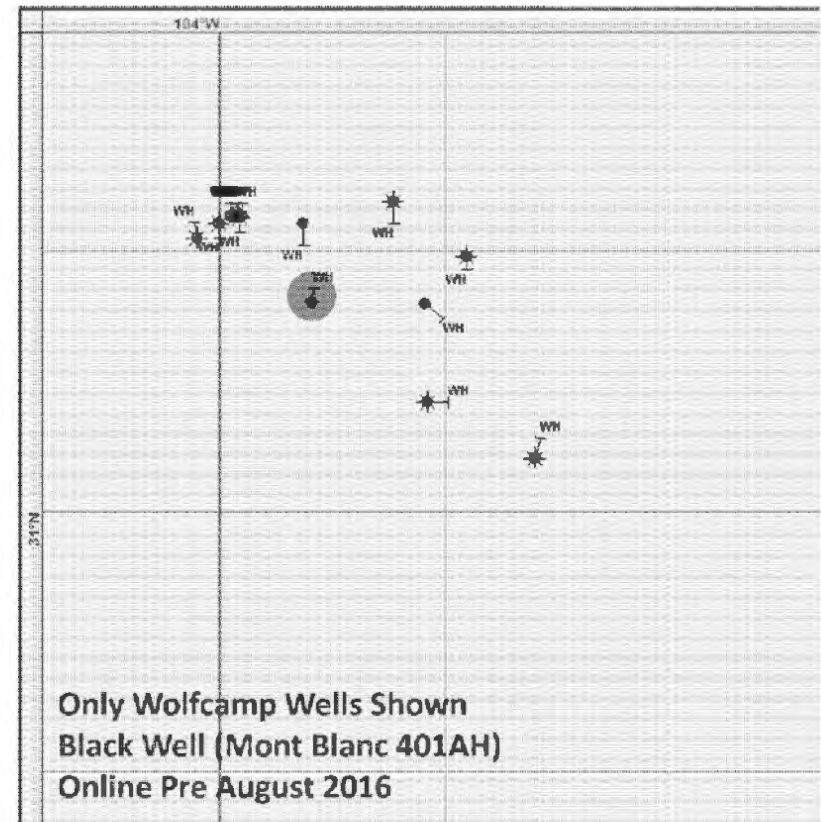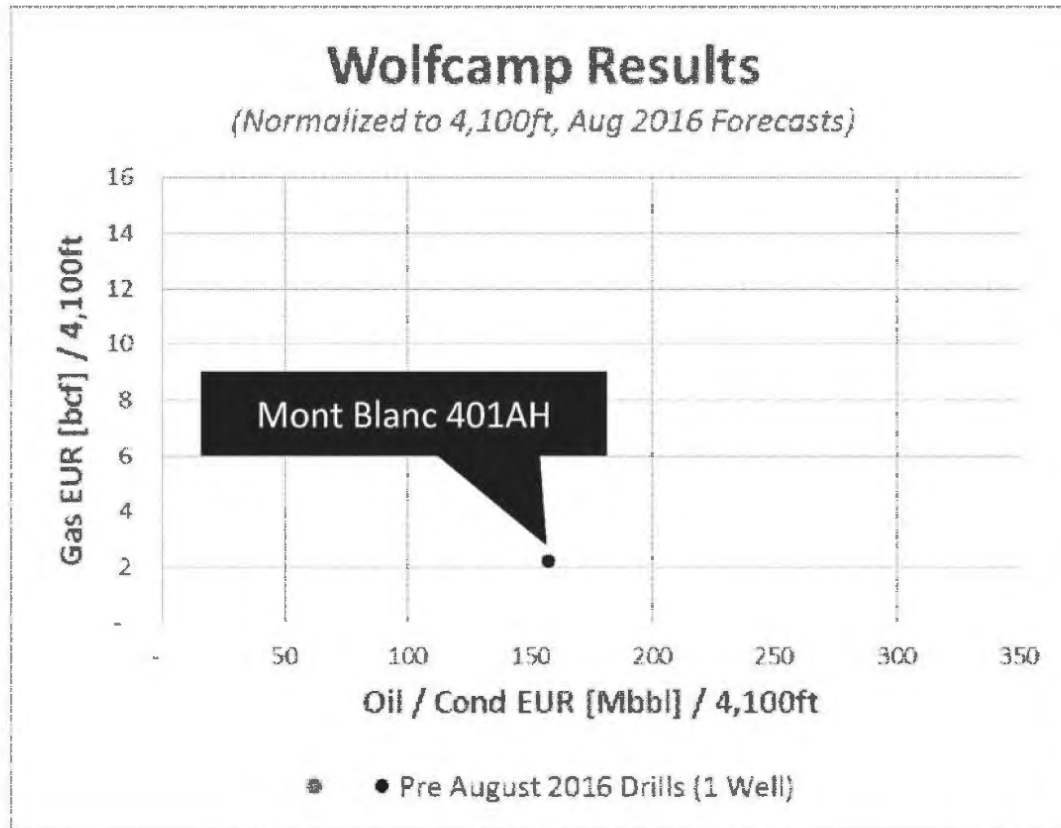*Apache*

MONT BLANC 201AH

Harmony EUR Forecast

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	Small OGIP (65%) (H=140ft; Xf= 300ft)	Base Case (H=170ft; Xf= 380ft)	Large OGIP (150%) (H=210ft; Xf= 460ft)
1 Year Producing (No Downtime)	1.8 bcf	1.8 bcf	1.8 bcf
5 Year Cum Gas	4.1 bcf	4.3 bcf	4.4 bcf
30 Year Cum Gas	6.1 bcf	8.6 bcf	10.5 bcf

OGIP Can Swing EUR by ~20%, But Only In The 5-30 Yr Period

Chart annotations:
- History Match To Downhole Pressure
- Assume Bottomhole Drawdown Continues to 500 psi
- Gas & Condensate Forecast to 30 Years (No Economic Limit)

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WOLFCAMP WELL PERFORMANCE

Aug 2016 Forecasts

Wolfcamp Results
(Normalized to 4,100ft, Aug 2016 Forecasts)

Mont Blanc 401AH

Gas EUR [bcf] / 4,100ft

Oil / Cond EUR [Mbbl] / 4,100ft

● Pre August 2016 Drills (1 Well)

Only Wolfcamp Wells Shown
Black Well (Mont Blanc 401AH)
Online Pre August 2016

WOLFCAMP WELL PERFORMANCE

Current Forecast

Wolfcamp Results

(Normalized to 4,100ft, Sept 2019 Forecasts)

Updated Forecast (Minor Change)

• Current Wolfcamp (13 Wells)   • Pre August 2016 Drills (1 Well)

First Well: Mont Blanc 401AH

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WOODFORD, BARNETT & WOLFCAMP

Current Forecasts

Woodford, Barnett & Wolfcamp
(Normalized to 4,100ft, Sept 2019 Forecasts)

- Current Wolfcamp (13 Wells)   ● Pre August 2016 Drills (1 Well)
- Current Woodford (120 Wells)   ● Pre August 2016 Drills (7 Wells)
- Current Barnett (52 Wells)   ● Pre August 2016 Drills (1 Well)
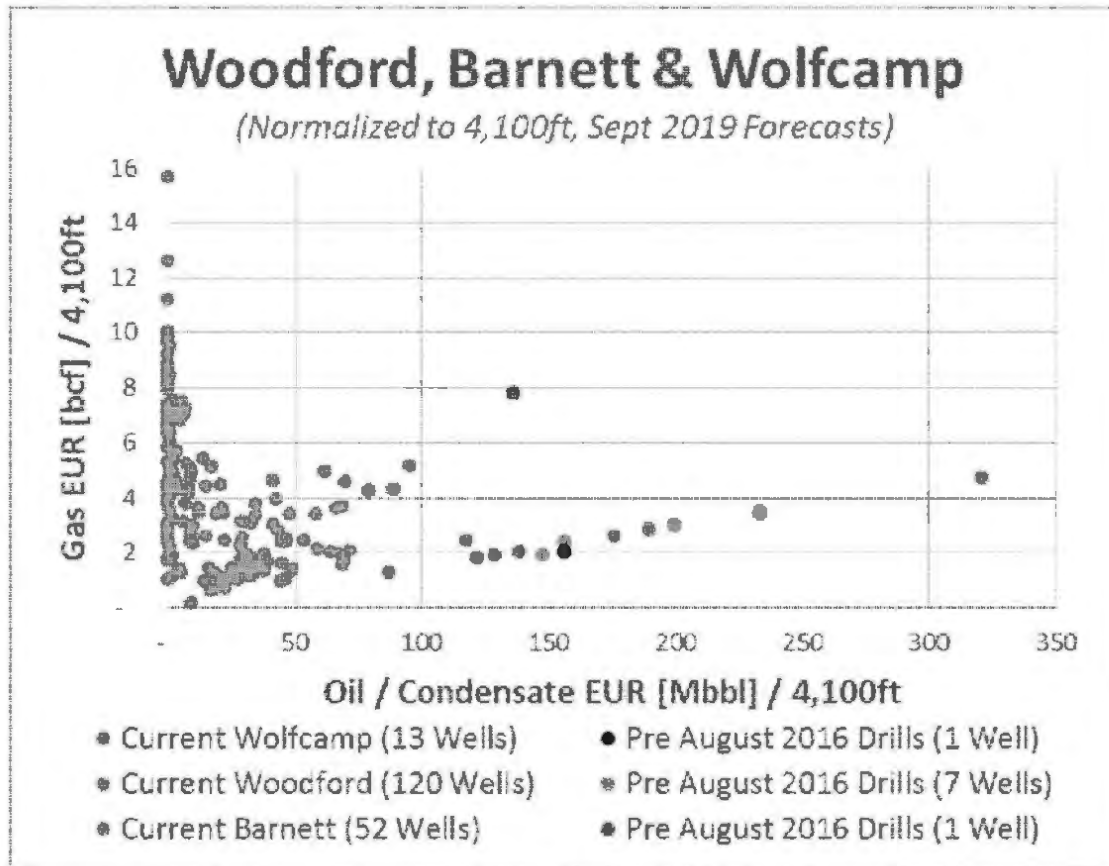
▶ Wolfcamp shows much higher liquid recovery,

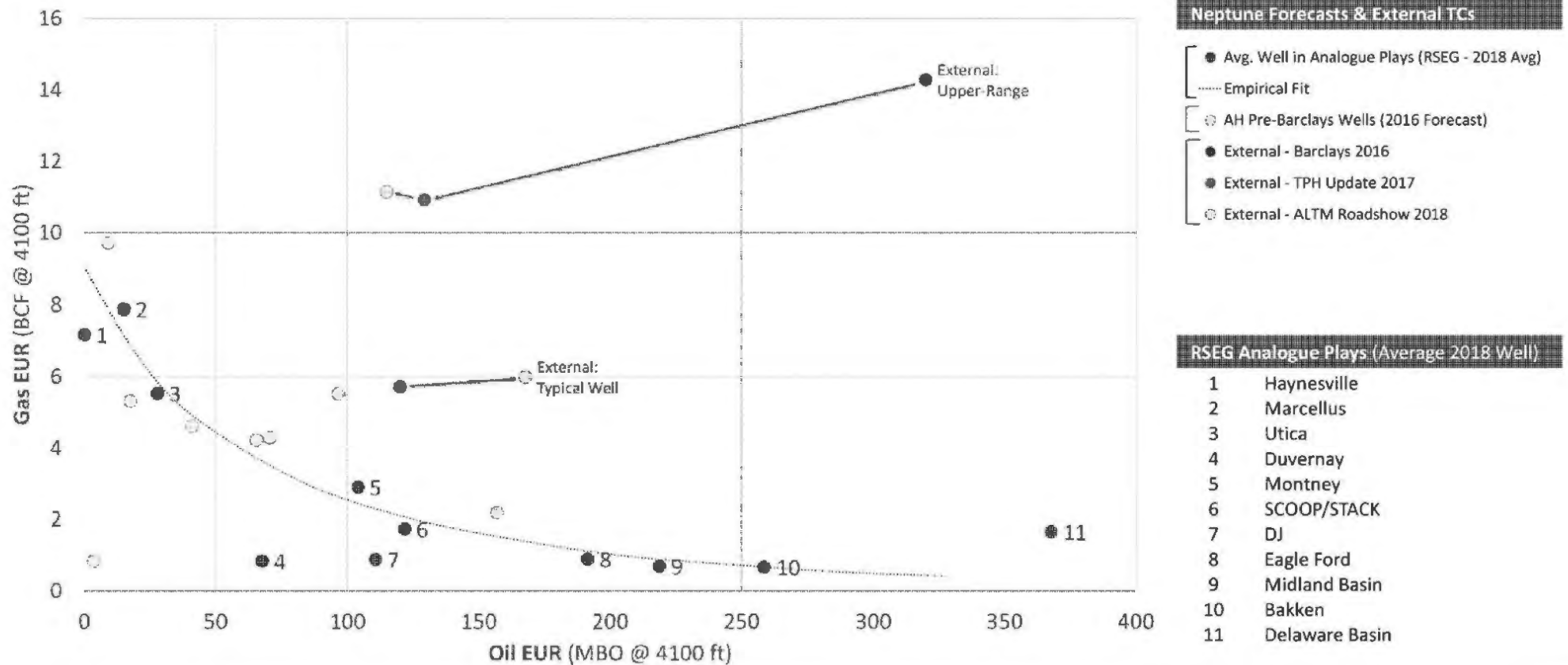 ▶ Total gas is similar to Barnett, but Wolfcamp gas IP is lower (associated gas has different profile)

Woodford, Barnett & Wolfcamp are 95% of Total Well Population

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COMPARISON TO ANALOGUE PLAYS

Economics of Early Alpine Wells -- Normalized to 4100 ft. Lateral Length
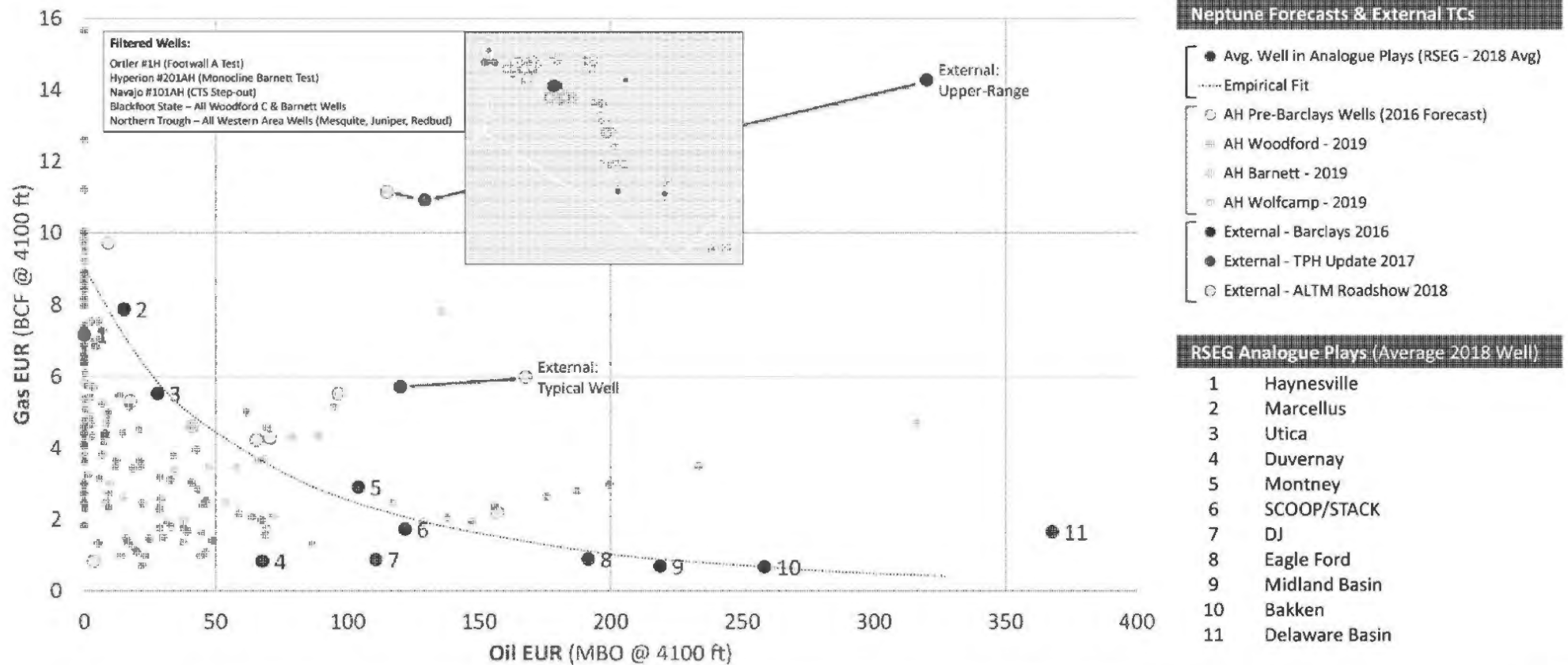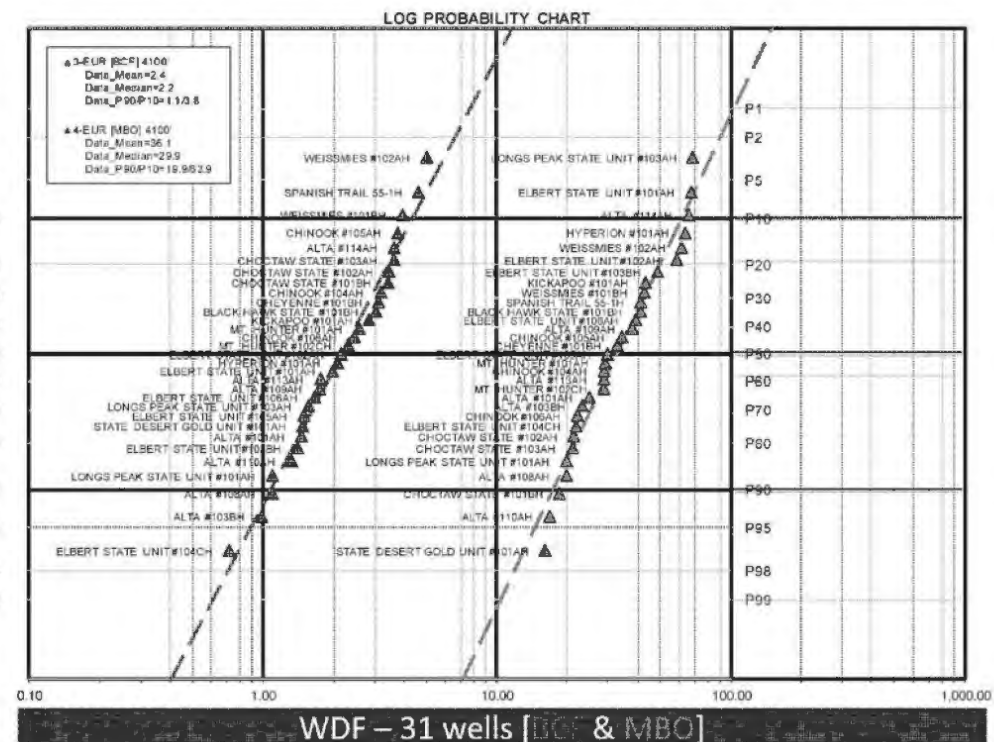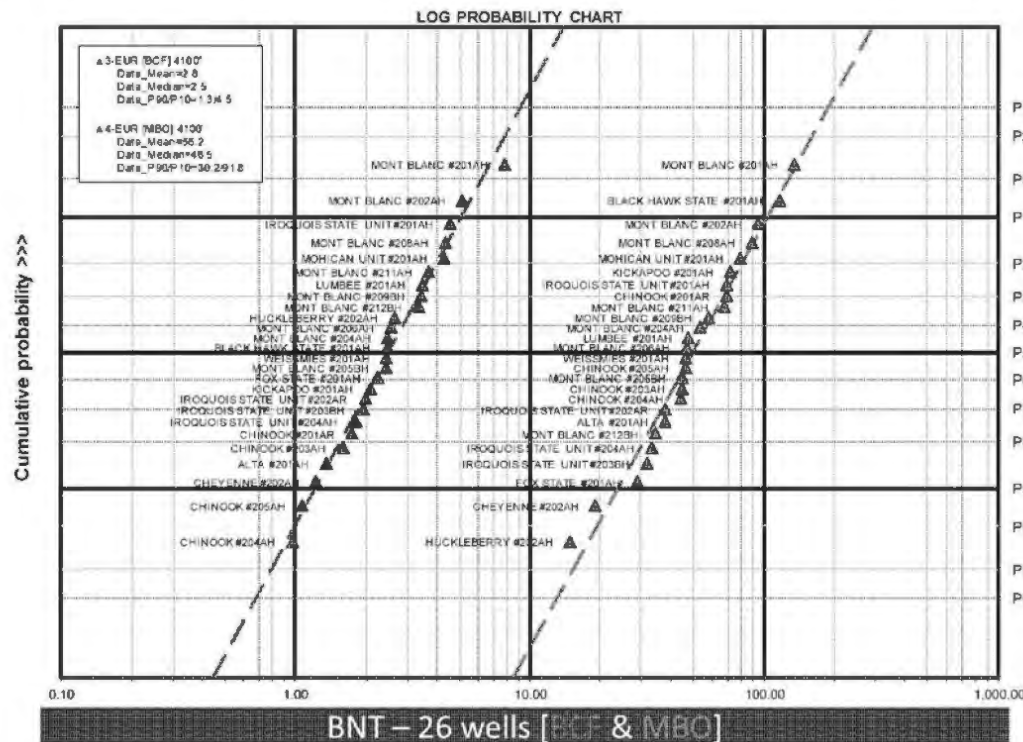

Analogue Plays: Data sourced from 2019 RSEG Presentation: *Breaking the (Digital) Barrier* (July 2019); represents average well drilled in each play in 2018 (RSEG forecasts)

COMPARISON TO ANALOGUE PLAYS

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Updated Alpine Well Results vs. Major North American Shale Plays

RICH GAS EUR EXISTENT WELLS DISTRIBUTIONS

Barnett & Woodford – CGR > 5 BO/MMCF. Normalized to 4100'

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ST TEST excluded
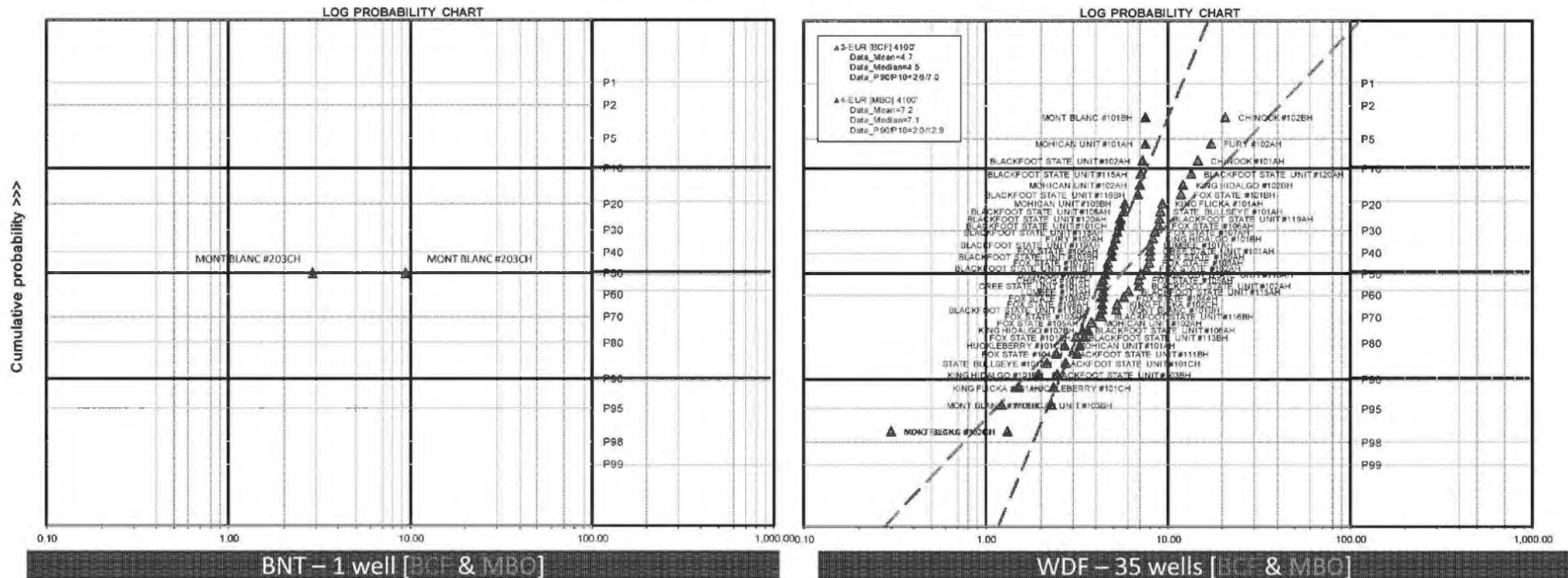

Combined Woodford and Barnett Rich Gas : **P50** Rich Gas ~2.4bcfe and Oil ~37kbbls   **P10** Rich Gas ~4.2bcfe and Oil ~72kbbls

LEAN GAS EUR EXISTENT WELLS DISTRIBUTIONS

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ST TEST excluded

Barnett & Woodford – 5 > CGR > 0.1 BO/MMCF. Normalized to 4100'

Woodford Lean Gas : **P50** 4.5bcfe and Oil 7kbbls **P10** 7.1bcfe and 13kbbls

DRY GAS EUR EXISTENT WELLS DISTRIBUTIONS

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Barnett & Woodford – 0.1 > CGR BO/MMCF. Normalized to 4100'   ST TEST excluded

Woodford Dry Gas : **P50** 6.9bcfe and **P10** 9.9bcfe   (No Change)

Apache   41 of these 59 wells do not go through the Cryo facilities for processing. The remaining 18 do produce NGLs even with CGR < 0.1
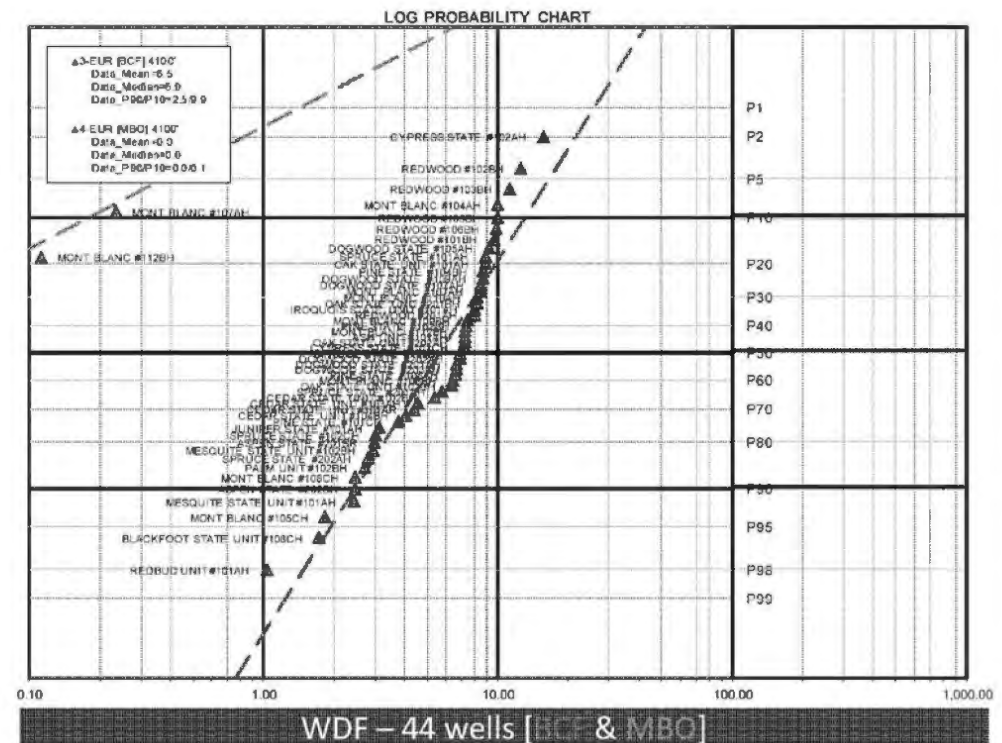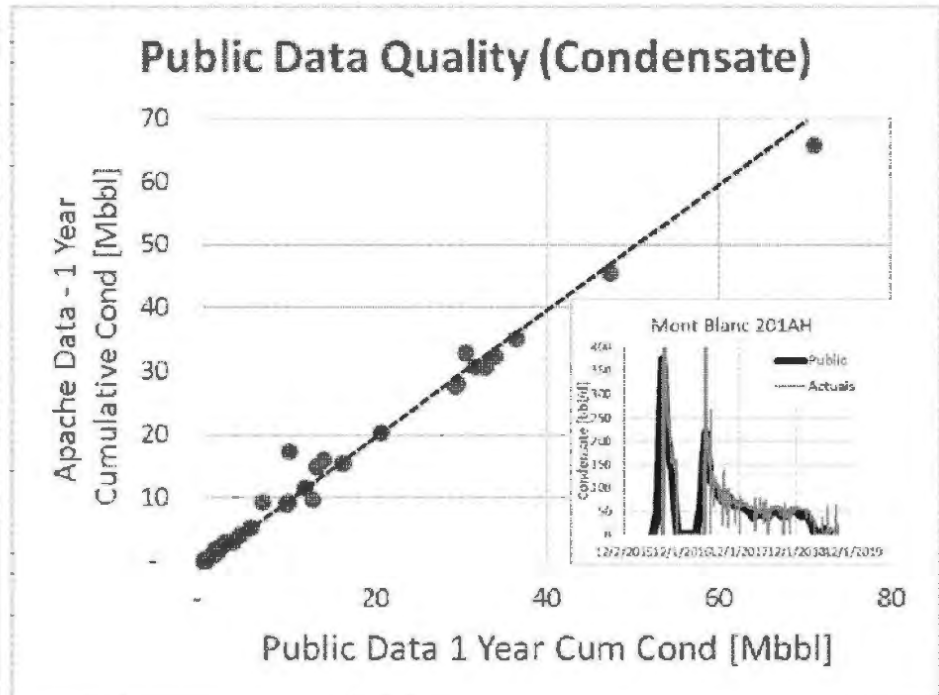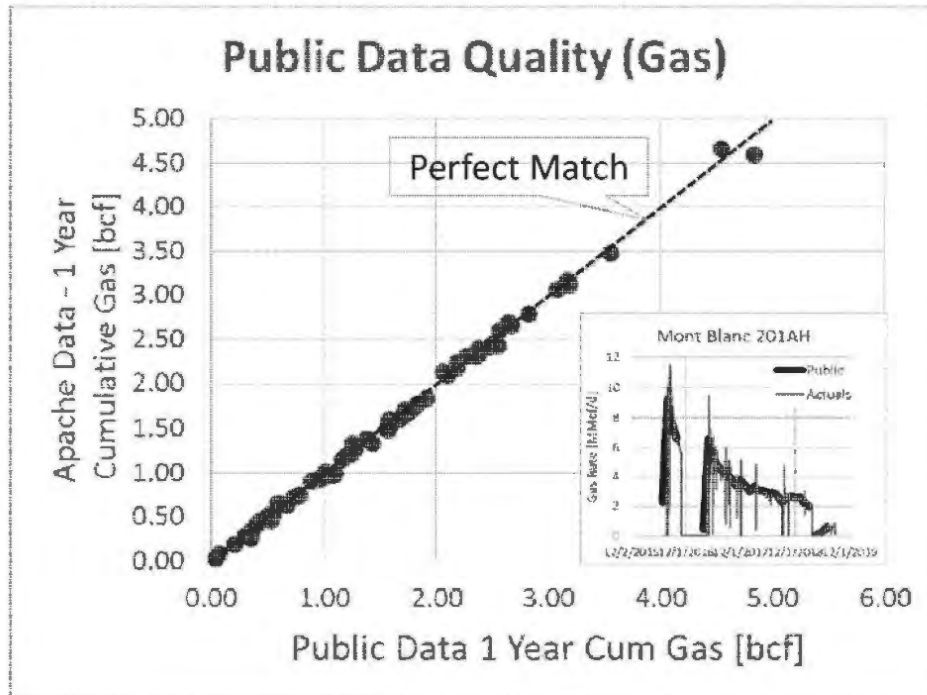
PUBLIC DATA QUALITY

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Public Data is Very Accurate for Gas and Condensate

- **Public Data is Accurate and Updated to July 2019 (3 Months Behind)**

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2019 DRILLING PROGRAM AUGUST OUTLOOK

Alpine High Outlook Summary Comparison

Feb BoD Prices

ALPINE HIGH	2019 PLAN - New Burd		2019 OUTLOOK		VARIANCE	
Well Counts	YTD	FY	YTD	FY	YTD	FY
Gross Operated Wells Online	58	87	62	89	4	2
Net Operated Wells Online	58.0	87.0	62.0	89.0	4.0	2.0
Gross Nonop Wells Online	-	-	-	-	-	-
Online Wells Full Life Capital						
CWC ($MM)	380	553	377	553	(3)	1
CWC + Central Fac. ($MM)	425	619	422	619	(3)	1
CWC + Central Fac. + Ovhd. ($MM)	446	650	443	650	(3)	1
2019 Drill Wedge Production (MBOE/D)	17.7	32.5	12.5	22.3	(5.2)	(10.2)
Op. Gross CWC/4,800' ($MM)	6.0	6.0	5.6	5.5	(0.4)	(0.4)
Op. Gross EUR/4,800' (MBOE)	1,784	1,908	1,127	1,263	(657)	(645)
Reserves Developed						
Net MMBOE	84.8	132.4	56.7	94.8	(28.1)	(37.6)
% Liquids	50%	51%	48%	48%	-2%	-3%
Unburdened Net F&D ($/BOE)	4.5	4.2	6.6	5.8	2.2	1.7
Burdened Net F&D ($/BOE)	5.3	4.9	7.8	6.9	2.6	2.0
Fully Burdened Economics						
Discounted Profitability Index (P/I)	1.07	1.13	0.67	0.76	(0.40)	(0.37)
Operating Cash Margin ($/BOE)	9.8	9.6	8.2	8.1	(1.7)	(1.5)
Recycle Ratio	1.9	2.0	1.0	1.2	(0.8)	(0.8)
NPV-10 ($MM)	31	78	(136)	(143)	(168)	(221)

Strip Prices (50 WTI / 2.50 HH)

ALPINE HIGH	2019 PLAN - New Burd		2019 OUTLOOK		VARIANCE	
Well Counts	YTD	FY	YTD	FY	YTD	FY
Gross Operated Wells Online	58	87	62	89	4	2
Net Operated Wells Online	58.0	87.0	62.0	89.0	4.0	2.0
Gross Nonop Wells Online	-	-	-	-	-	-
Online Wells Full Life Capital						
CWC ($MM)	380	553	377	553	(3)	1
CWC + Central Fac. ($MM)	425	619	422	619	(3)	1
CWC + Central Fac. + Ovhd. ($MM)	446	650	443	650	(3)	1
2019 Drill Wedge Production (MBOE/D)	17.7	32.5	12.5	22.3	(5.2)	(10.2)
Op. Gross CWC/4,800' ($MM)	6.0	6.0	5.6	5.5	(0.4)	(0.4)
Op. Gross EUR/4,800' (MBOE)	1,784	1,908	1,127	1,263	(657)	(645)
Reserves Developed						
Net MMBOE	84.8	132.4	56.7	94.8	(28.1)	(37.6)
% Liquids	50%	51%	48%	48%	-2%	-3%
Unburdened Net F&D ($/BOE)	4.5	4.2	6.6	5.8	2.2	1.7
Burdened Net F&D ($/BOE)	5.3	4.9	7.8	6.9	2.6	2.0
Exploration Success (%)					-	-
Fully Burdened Economics						
Discounted Profitability Index (P/I)	0.61	0.63	0.34	0.38	(0.28)	(0.25)
Operating Cash Margin ($/BOE)	5.1	4.9	3.6	3.6	(1.5)	(1.3)
Recycle Ratio	1.0	1.0	0.5	0.5	(0.5)	(0.5)
NPV-10 ($MM)	(163)	(224)	(278)	(373)	(115)	(150)

Net Price Realization Comparison

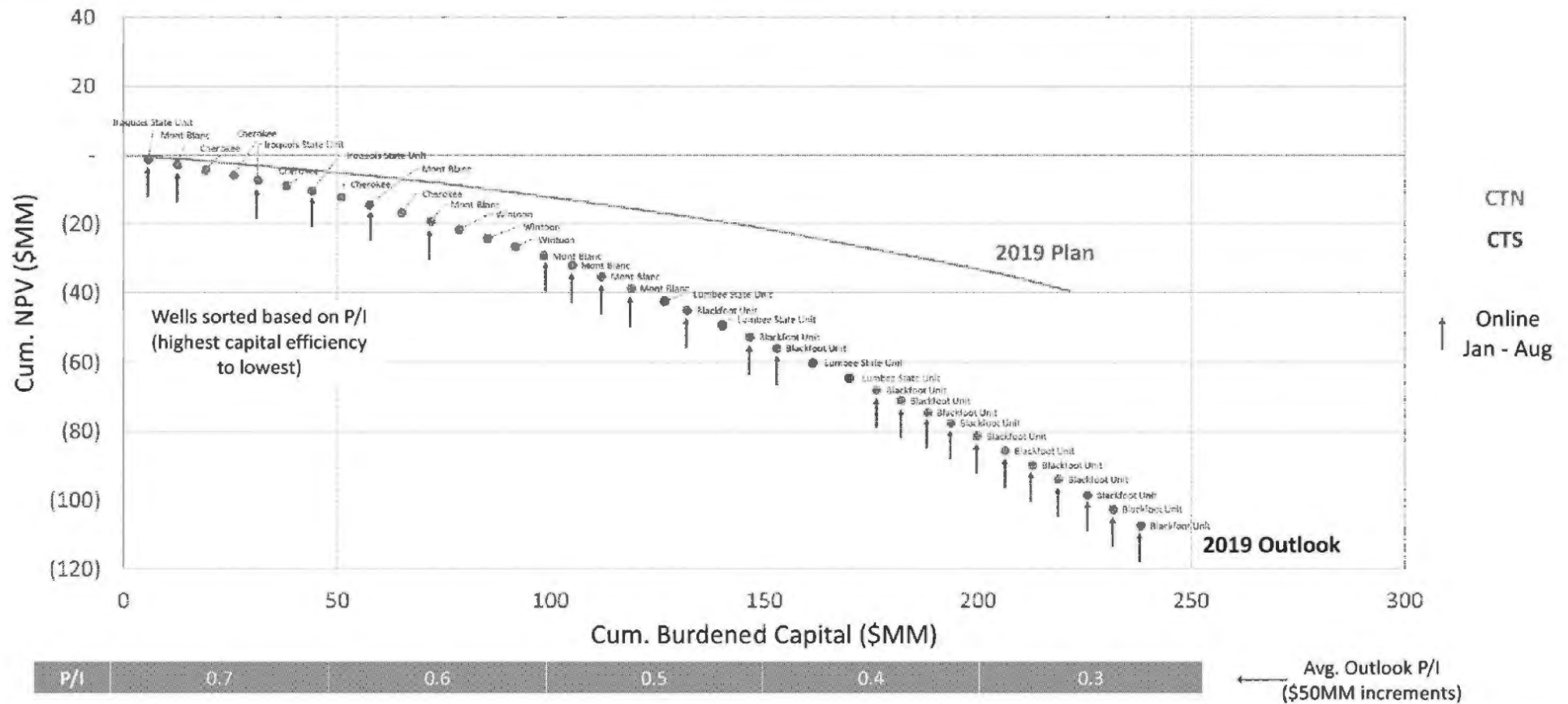| Scenario	Net Oil $/Bbl	Net Gas $/Mcf	Net Ethane $/Bbl	Net Propane $/Bbl	Net Butane $/Bbl	Net Pentane $/Bbl
Feb BoD	51.70	2.19	12.69	27.39	29.49	48.38
Strip	46.70	1.90	5.55	16.89	18.99	37.88

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WHAT DOES THE REGION REALLY THINK?

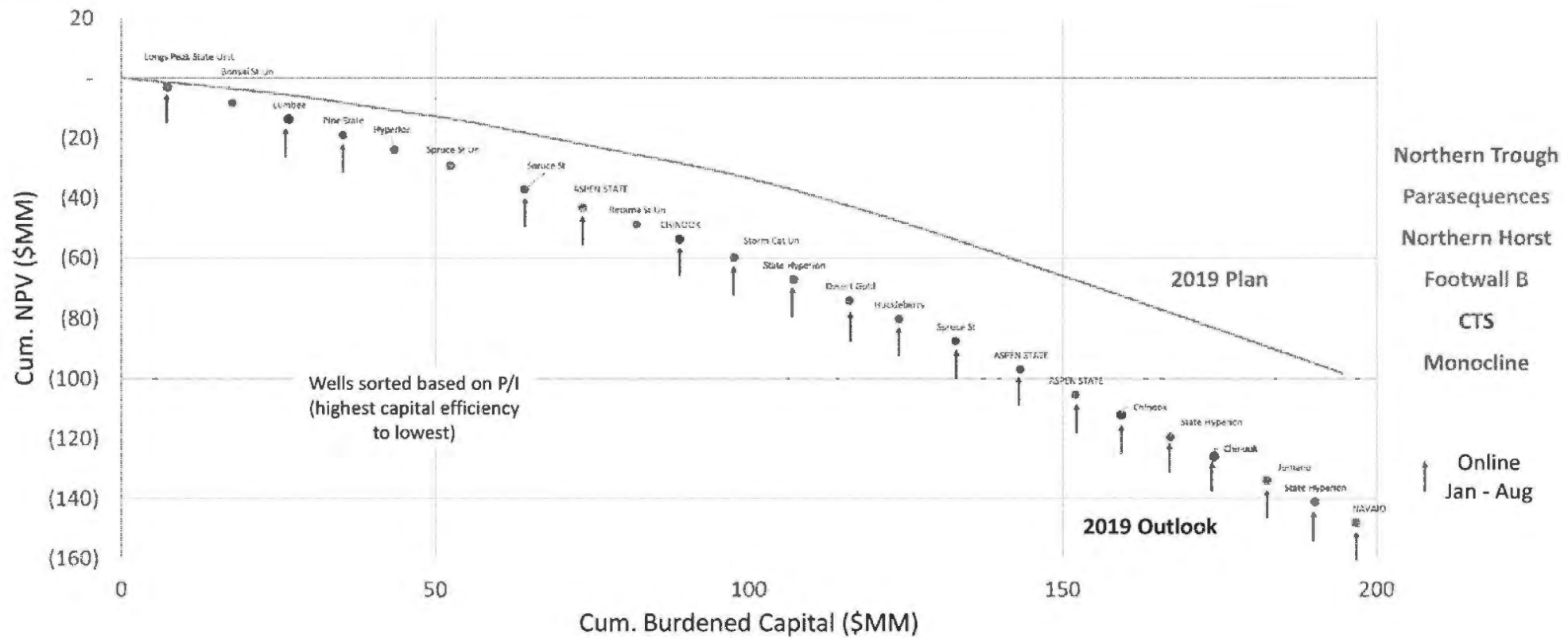Plan Submissions with Revisions – Woodford 2019
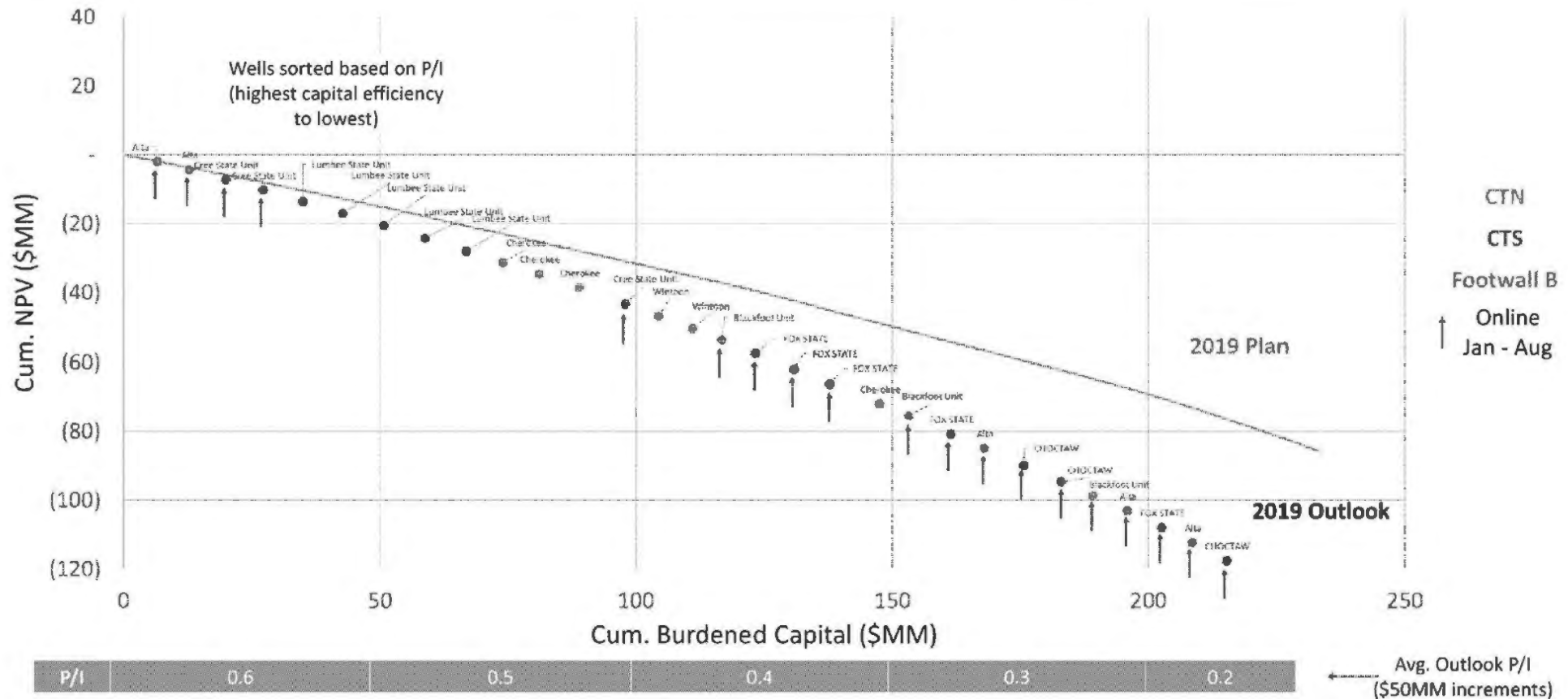
WHAT DOES THE REGION REALLY THINK?

Plan Submissions with Revisions – Barnett 2019

WHAT DOES THE REGION REALLY THINK?

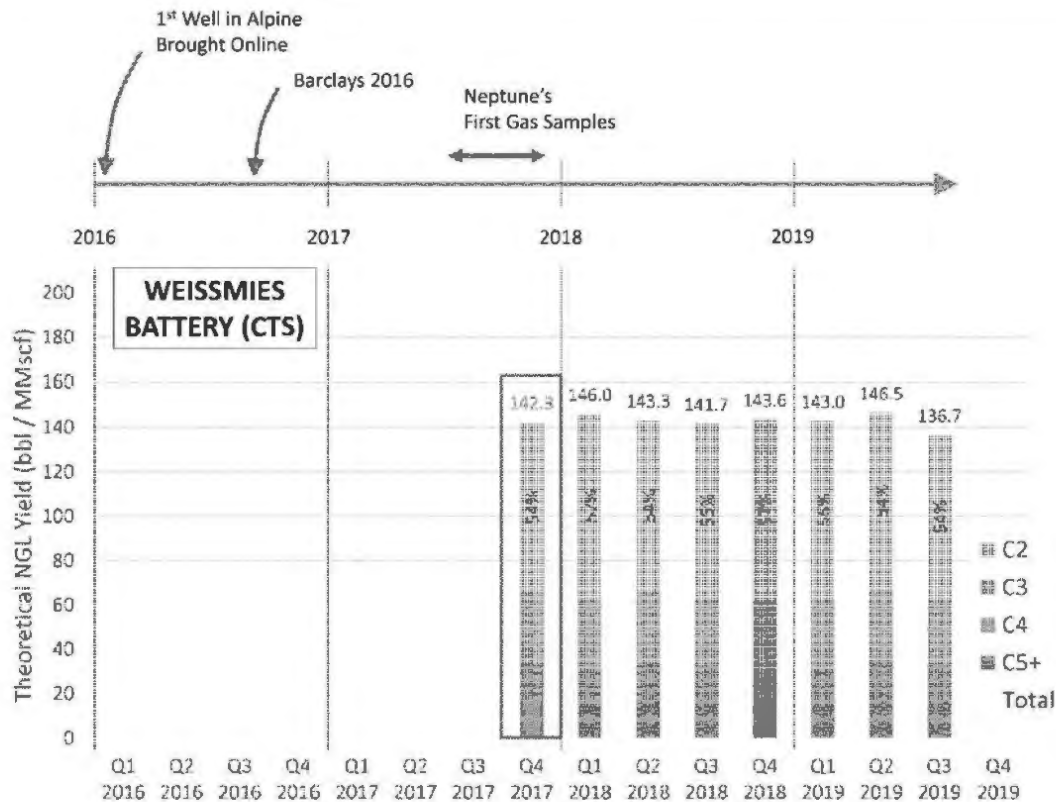Plan Submissions with Revisions – Strategic Tests 2019

THEORETICAL CRYO NGL YIELDS

CTB-Level Analysis

CTB Name	Mont Blanc	Black Hawk	Fox State	Weiss-mies	Cheyenne
Setting	CTN	CTS	CTS	FW	FW

Wells online at First Neptune Gas Sample:

	Mont Blanc	Black Hawk	Fox State	Weiss-mies	Cheyenne
Parasequences	1	-	-	-	-
Penn	1	1	-	1	-
Barnett	2	1	-	1	1
Woodford	1	1	1	2	1
Total Wells	5	3	1	4	2

Theoretical Cryo NGL Yield from CTB Gas Samples

	Mont Blanc	Black Hawk	Fox State	Weiss-mies	Cheyenne
Blended Yield	130	142	129	142	143
Parasequences	?	-	-	-	-
Penn	?	?	-	?	-
Barnett	140**	160*	-	160*	160*
Woodford	90**	130*	129	130*	130*

* Low confidence; solution is non-unique

Assumed Cryo Efficiency: 98% C2, 99% C3+

THEORETICAL CRYO NGL YIELDS

Other Early CTBs

GAS PRODUCTION AND NGL SALES 2017-2019
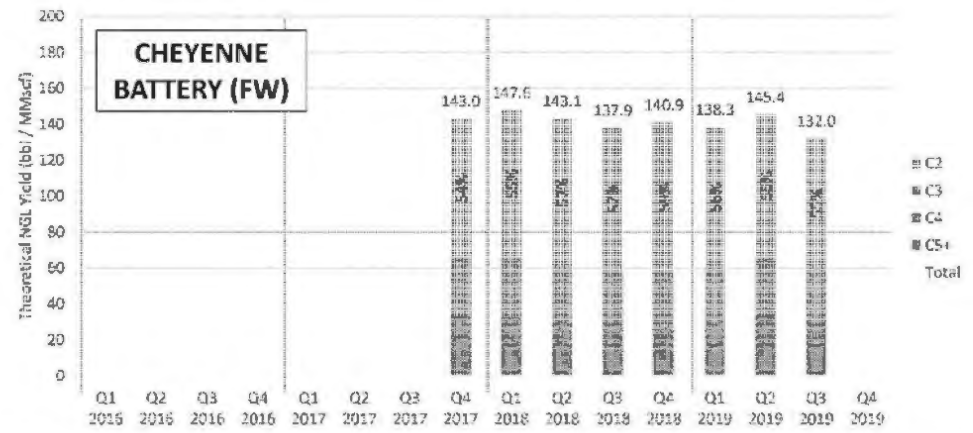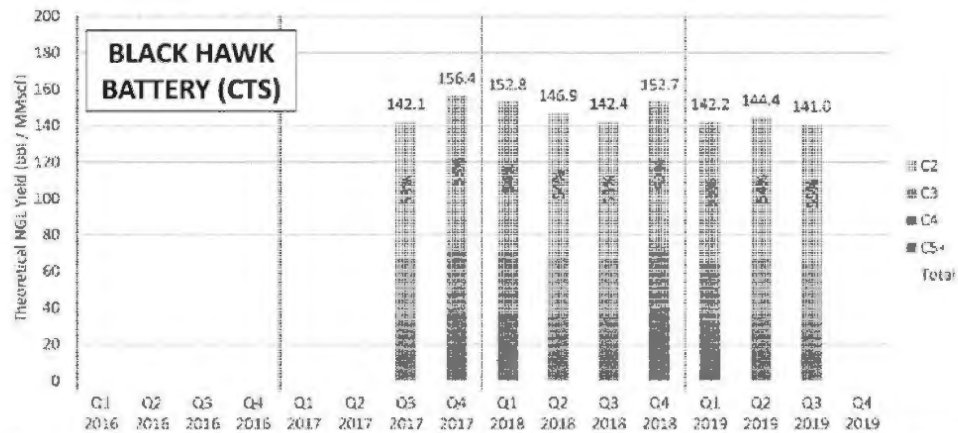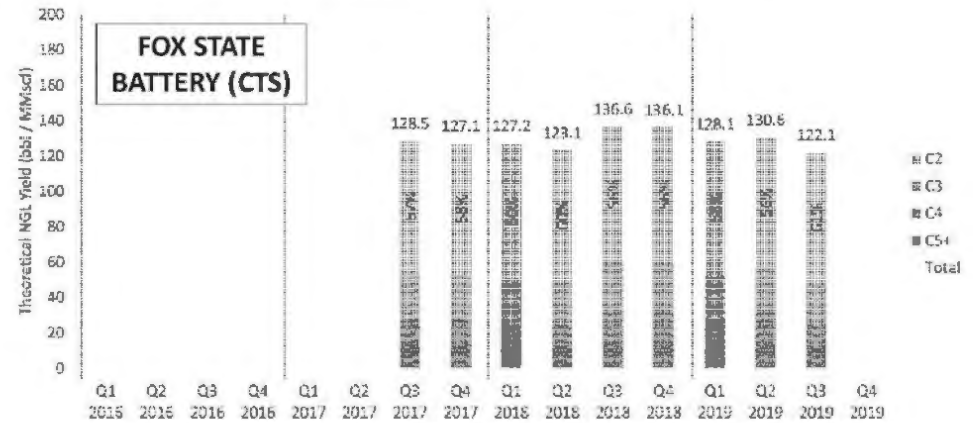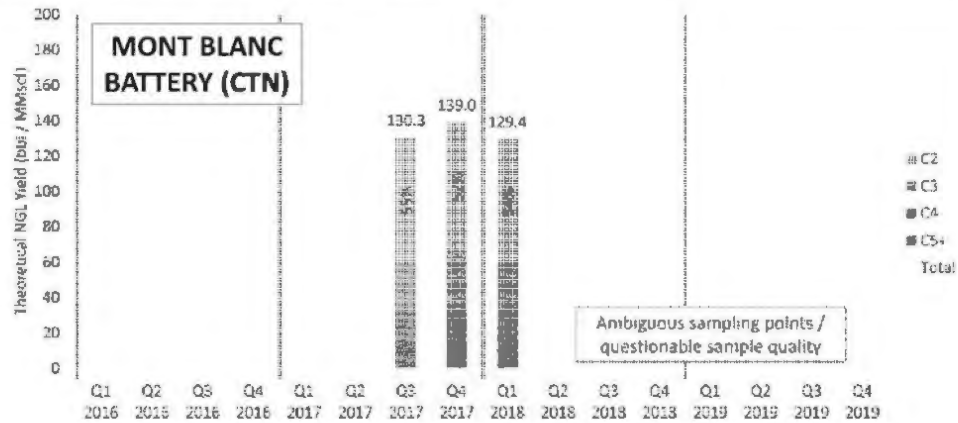
Revenue accounting data source

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Total gas production

Dry gas production

Wet gas production & NGL sales

100 – 120 BNGL / MMCF after CRYO (50 – 55% C2)

Assumed **130 BNGL / MMCF for Rich Gas** & **80 BNGL / MMCF fore Lean gas** until existent well head chromatography gathered

COST INCREASE FROM 4,100FT LATERALS

($ Millions)	4,100 Ft Laterals	10,000 Ft Laterals
Drill	$2.3	$2.8
Complete	$2.1	$4.0
Equip	$0.7	$0.7
Total Cost	$5.2	$7.5
$ / 4,100 Ft	$5.2	$3.1

Drilling Short Laterals Equivalent to Adding 70% to Capital Costs

Costs Based on Midland Basin WCB (Powell)

Apache